JUNE 15, 1915
VOL. IX. NO. 4

SINGLE COPIES, 25c.
ONE YEAR, $1.00

TRANSPORTATION LIBRARY
TL
1
.C73
V.9
no.4

OFFICE OF THE CHIEF OF ENGINEERS
JUN 21 1915
MILITARY SECTION

LIBRARY OF THE

THE COMMERCIAL CAR JOURNAL

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa.

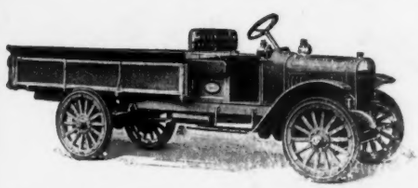
MR. GOULD
MR. McGOWAN
MR. DUFFIELD
MR. LEWIS
MR. VAN [illegible]
MR. BUELL

REPUBLIC

"The Honest Truck at an Honest Price"

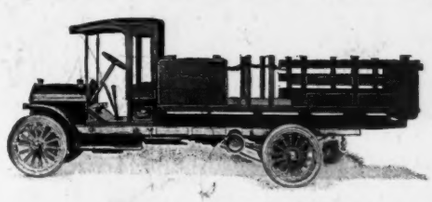
1½--2 Ton Internal Gear
$1575

Upon this line dealers all over the country have built up wonderfully successful agencies, because the various models were correctly designed, embodied proved standard parts, proved exceptionally efficient in service, were low in price and offered the most remarkable truck values in America.



¾ ton Internal Gear, with Express Body, $995

Write for specifications and the details of our selling plan



Chain-Drive Model
1 ton Chassis - - $1350
1½ ton Chassis - $1475

REPUBLIC MOTOR TRUCK CO., Alma, Mich.

PUBLISHED THE 15TH OF EACH MONTH

CHILTON COMPANY

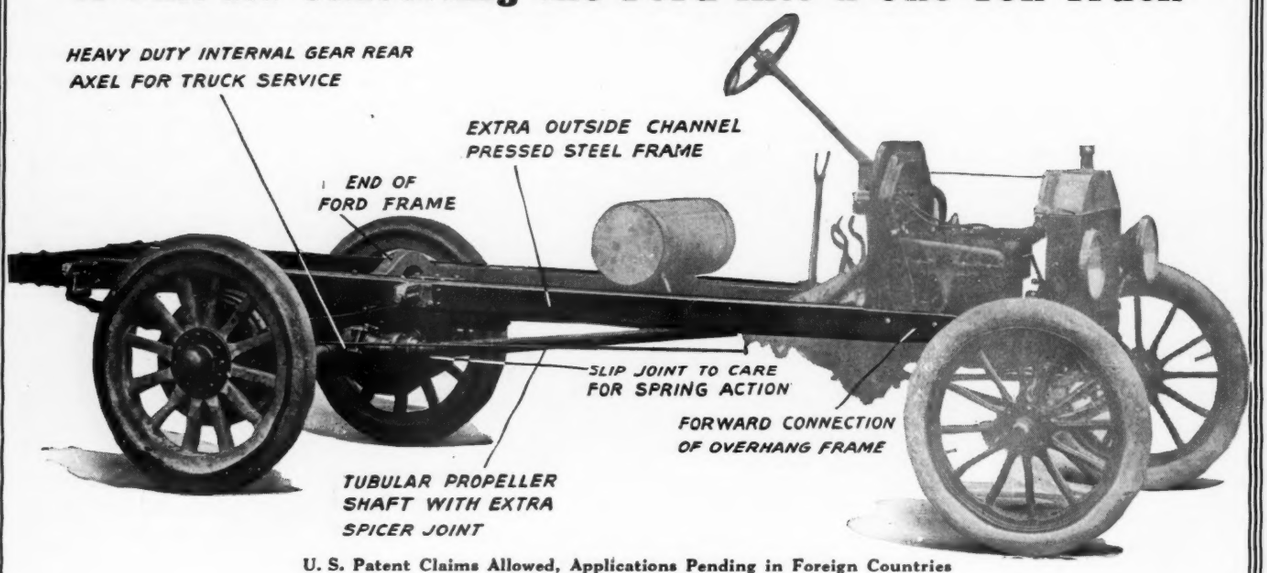
MARKET & 49TH STS. PHILADELPHIA

UNIVERSITY OF MICHIGAN LIBRARIES

HUDFORD

COMMERCIAL CHASSIS

A unit for converting the Ford into a One-Ton Truck


HEAVY DUTY INTERNAL GEAR REAR AXEL FOR TRUCK SERVICE
EXTRA OUTSIDE CHANNEL PRESSED STEEL FRAME
END OF FORD FRAME
SLIP JOINT TO CARE FOR SPRING ACTION
FORWARD CONNECTION OF OVERHANG FRAME
TUBULAR PROPELLER SHAFT WITH EXTRA SPICER JOINT

U. S. Patent Claims Allowed, Applications Pending in Foreign Countries

$325

Cut shows the Ford Chassis after being converted by the HUDFORD UNIT into a one-ton truck chassis —shaded portion is HUDFORD UNIT.

The HUDFORD

consists of an auxiliary frame, an internal gear driven truck rear axle, with truck wheels and solid tires, 34x3½, semi-elliptic truck springs and a heavy pressed-steel channel section auxiliary frame, which entirely replaces the rear construction of the Ford car.

Surrounds and is attached by cross frame members to the Ford frame so that the original Ford frame becomes virtually a subframe carrying the engine, while the main frame is that of the HUDFORD UNIT, which extends 56 inches beyond the original Ford frame, giving the car a total frame length of 10 ft., 8 in., and a wheel base of 120 inches.

The drive is by large tubular propeller shaft, with extra universal slip joint at rear end to take care of spring action.

The axle is geared 7 to 1. This low gearing enables the Ford engine to handle a ton load easily, and gives a normal speed of from 15 to 18 miles per hour.

If desired, a gear of 6 to 1 instead of 7 to 1 can be had, and the rear equipped with pneumatic tires.

The rear wheels of the Ford, with their larger tires, are put on the front, otherwise the forward construction of the Ford car remains entirely unchanged.

The HUDFORD can be attached in a few hours.

How Weight Is Distributed

90% of the load is carried on the rear truck axle and frame which constitute the HUDFORD UNIT—the front of the Ford car, which is the only part that remains intact, carries practically no more weight than it would as a Ford touring car.

DEALERS!!

The HUDFORD UNIT lists at $325, making it possible for you to furnish your customers with a one-ton truck for $650.

Selling the HUDFORD UNIT is going to bring a big income to dealers we select as agents.

We do not require quantity orders—trade discounts being given to dealers ordering a demonstrator.

If you appreciate the opportunity offered by the HUDFORD you will write or wire us for complete information today.

HUDFORD COMPANY 635 North Broad Street PHILADELPHIA, PA.

THE PUBLISHERS' PERSONAL PAGE

"What the fool does in the end the wise man does in the beginning"

Dedicated to the Pessimist

To those who do not believe in the future of the truck business, the following facts are submitted. The future of the truck and tractor business can only be judged by estimating the amount of work there is in the United States that can be done by the truck and tractor.

What Is To Be Displaced?

A conservative estimate of the work possibilities of the average truck and tractor is that it can displace at least four horses or mules. According to government figures there are 26,000,000 horses and mules in this country. If these are ever displaced, it will require an output of about 6,500,000 trucks. At the present rate of manufacture this will take about eighty to one hundred years. We are not optimistic enough to believe the horse is going to be completely displaced, but the time is surely coming when he will be as scarce for business as he is now for pleasure.

Enormous Increase Required

In 1914 we produced in the United States about 44,000 trucks. For 1916 we estimate there will be manufactured about 85,000 trucks, an increase of 41,000. There need be no fear that such an increase will cause an overproduction. From the government statistics of 1899 and 1904, there was an increase of 73,327 horsewagons, and from the 1909 figures, which are the latest available, there were 587,685 horse-drawn wagons produced. The production of commercial cars thus far has no more than equaled the normal increase in the production of horse-drawn wagons, let alone displacing the bulk of them, as the truck will eventually do.

The horse is not only the most wasteful but the most costly of motors, as will be shown in our next issue.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

AUTOCARS HAVE STANDARDIZED DELIVERY SERVICE

Chassis Price, $1650

The purchase of nine more Autocar Motor Vehicles by the New York City Department of Water Supply, Gas and Electricity, is evidence of the value attached to motor truck service by municipalities as well as mercantile interests. The New York Water Department now has a fleet of fourteen Autocars, constituting a force for repair work and the quick transportation of men and supplies.

Write for illustrated catalog and list of over 2,500 concerns using Autocars in every line of business.

THE AUTOCAR COMPANY

Ardmore, Pa.

Established 1897 MOTOR CAR DELIVERY SPECIALISTS

The Commercial Car Journal

VOLUME IX | PHILADELPHIA, JUNE 15, 1915 | NUMBER 4

COMMERCIAL CAR GOVERNORS DISCUSSED BY METROPOLITAN SECTION OF S. A. E.

At the May meeting of the Metropolitan Section of the Society of Automobile Engineers, held in New York City, Theodore Douglas, president of the Duplex Engine Governor Company, Inc., presented a paper entitled, "Motor Vehicle Governors," in which he outlined and criticised all the different types of governors employed at present on commercial cars. He also gave his ideas of an ideal governing device which we present herewith:

The Ideal Vehicle Governor

The qualities which an efficient vehicle governor should possess can be summarized as follows: Power, sensitiveness, flexibility, delivery, regularity, and steadiness.

Power.—This is the most important quality of a governor, and upon it, and its proper balance, will depend very largely its efficiency. To possess this quality effectively the governor must be static, that is, be a one-speed, one-position governor.

Sensitiveness.—This quality is dependent on a positive increase and decrease in power between small variations of position, and hence of speed, and the difference in speed between any two positions must be small.

Flexibility.—The governor should be capable of maintaining the power output of the engine closely proportionate to the power requirement, regulating to low engine speeds for high gear service, where low power is required, and to higher engine speeds for low gears when the maximum power capacity of the engine can be effectively employed.

Delivery.—This quality is dependent largely on the type of control valve employed. The governor construction should be such as to include, and to co-ordinate with, a valve of such design as to require but slight travel in effecting its extremes of position. The valve should be non-fluttering, of low resistance to the gas flow, and offer, in the automatic control of the engine, full throttle, when necessary, until practically the moment of required cutoff is reached.

Regularity.—The governing influence, power and valve closure should vary proportionately as the speed; or, between the extremes of the governor range the differences in power and closure between any two required intermediate positions, should be equal.

Steadiness.—By this is meant a smoothness of control, free from surge, valve flutter, or hunting. The valve should glide, rather than be jerked, from one position to another. It is obvious that a vehicle governor should be fool-proof, tamper-proof, durable, and of reasonably low cost.

Gramm Motor Truck Company. Lima, Ohio, announced that orders have been booked from the English government for $2,000,000 worth of motor trucks for war purposes. The order will keep the plant busy night day for the remainder of the year.

Table of Contents

	PAEG
Advertisers' Index	95
Accessories and Appliances	22
Atterbury New Three-Ton Worm-Drive Truck	17
Commercial Cars Handling Farm Produce Around Kansas City—By W. D. Meng	34
Commercial Cars Solve the Great Problem of Food Supply for the Congested Centers of Population—By E. S. Foljambe	9
Commercial Cars as Used in Buffalo—By George W. Grupp	42
Continental—New Truck From Chicago	20
Editorials	7
Farmer and the Commercial Car—By Charles H. Spencer	36
Farmers and Produce Men Use Commercial Cars—By W. D. Meng	14
Foreign News—From Across the Water	25
Garford New One and a Half Ton Worm-Drive Truck	19
M. T. A., of Philadelphia, Activities	40
Motor Truck Design and Construction Made Plain—By C. T. Schaefer	28
Provision Company, After Long Use of Truck, Finds Figures Low for Work Done	39
Service Brings Out Two New Worm-Drive Models	18
Steel Wheels, Notes On	26
Truck Body for Farmers	37
Trucks Increasing in Importance in Chicago Food-Supply Problem	38
War and Civil Transport, The	25
Western New York Farmers and Produce Merchants Use Trucks—By George W. Grupp	33

BOSTON TRUCK DEALERS TO HAVE SHOW IN MARCH

Boston Vehicle Dealers' Association at its annual meeting on May 4th voted to co-operate with the Boston Automobile Dealers' Association and have a show in March, taking part of the Mechanics Building, at the same time the passenger car show is held. The following officers were elected: Josiah S. Hathaway, president; James M. McGuire, vice-president; Day Baker, treasurer; Chester I. Campbell, secretary. These officers, with the following, comprise the Board of Directors: P. S. Altman, C. P. Rockwell, Norman Halliday, John L. McKone and John H. MacAlman.

The Lauth-Juergens Motor Car Company, of Sandusky, O., is to be taken over by an English syndicate, the H. G. Burford Company. The company named was chartered on May 27, 1915, under Ohio laws, with a capital stock of $250,000, of which $100,000 is preferred and $150,000 common. It is understood that the new corporation is to pay all the debts of the Lauth-Juergens Company, which will continue the business until all details are arranged and the transfer made, and that the new company will invest additional capital.

ANNUAL MEETING OF THE N. A. C. C.

The National Automobile Chamber of Commerce on June 2d held its annual meeting in New Work City, at which Charles Clifton was returned to the office of president. J. Walter Drake, R. E. Olds and Carl H. Pelton were new directors elected for a term of 3 years, and Alvan McCauley, William E. Metzger and C. W. Churchill, directors, have been re-elected.

The following companies were admitted to membership: L. P. C. Motor Company, Racine, Wis.; Scripps-Booth Company, Detroit; Lexington-Howard Company, Connersville, Ind.; The Touraine Company, Philadelphia; Pratt Motor Company, Elkhart, Ind.; W. A. Paterson Company, Flint, Mich., and Sternberg Company, Milwaukee, Wis.

At the directors' meeting, following the annual gathering, the following officers were elected: Charles Clifton, president; Wilfred C. Leland, vice-president; Hugh Chalmers, second vice-president, Gasoline Passenger Division; Windsor T. White, second vice-president, Commercial Vehicle Division; H. H. Rice, second vice-president, Electric Vehicle Division; R. D. Chapin, secretary; George Pope, treasurer, and Alfred Reeves, general manager.

Besides the reports for the year's work made by the committees on patents, traffic, commercial cars, good roads and legislations, there was a spirited discussion on the jitney 'bus situation, and the conclusion was reached that this important method of transportation should be encouraged and supported by the car makers. It was brought out that proper regulation of the 'bus lines and 'bus service should be encouraged, provided it was not of a confiscatory nature.

Standard treads in motor cars, with a view of reducing manufacturing costs to the ultimate advantage of the consumer, will be carried on more vigorously this year.

There was a long discussion on the proper time for making annual announcements and a special committee was appointed to make recommendations. Figures supplied at the meeting showed that the automobile year, which ends on June 30th, will see a greater number of cars made than ever before in the history of the industry, with the most optimistic preparations being made for another year.

Torbensen Gear & Axle Company, Newark, N. J., owing to the rapidly increasing demand for internal gear axles, has been obliged to secure another place. A factory having five times the present capacity has been acquired at E. 72d Street and L. S. & M. S. R. R., Cleveland, Ohio. A complete line of sizes of front and rear truck axles will be manufactured at this plant, and the main offices will be established there.

The CCJ leads in circulation, advertising and prestige

PREST-O-LITE COMPANY ENTERS ELECTRIC LIGHTING FIELD

The entrance of The Prest-O-Lite Company, Inc., of Indianapolis, into the electric lighting field has just been announced. The company is now manufacturing the Prest-O-Lite storage battery.

Of no less interest will be the fact that The Prest-O-Lite Company, with its famous system of service, including 35 factory branches and more than 20,000 agencies throughout the country, aims to place behind the Prest-O-Lite battery a system of service stations of unusual character and scope.

The company states that its new interests will in no way interfere with the extension of its business in the well-known Prest-O-Lite acetylene system. Notwithstanding the popular impression that the widespread use of electric illumination on automobiles has adversely affected the gas-lighting industry, The Prest-O-Lite Company states that the use of gas lighting in automobile practice is to-day larger than ever before and is still growing.

The Prest-O-Lite storage battery is designed as a distinctive type in the battery field. While embodying nothing that is revolutionary, the design will include features upon which strong claims of increased current capacity, in connection with decreased weight, will be based.

As a part of its activity in its new field, The Prest-O-Lite Company on June 1st purchased and absorbed the entire business, assets and patents of the Pumpelly Battery Company, of Indianapolis, and has incorporated in the new Prest-O-Lite battery many features of the more recent Pumpelly types.

Harry Murphy, president of the Pumpelly Battery Company, becomes a vice-president of The Prest-O-Lite Company, in addition to the company's vice-president and treasurer, James A. Allison. Mr. Murphy will have active charge of the Prest-O-Lite battery department. The Pumpelly personnel has been absorbed into the Prest-O-Lite organization.

FEDERAL RUBBER COMPANY ORGANIZES WELFARE DEPARTMENT

Federal Rubber Manufacturing Company, Milwaukee, Wis., has organized a Safety First and Welfare Department. This campaign of education along safety-first lines among the employees has brought about a decrease in accidents of approximately 75 per cent. There has also been organized a Federal Rubber Employees' Association which makes each employe eligible, by the payment of a nominal sum each month, to sickness or death benefits.

The Jones Speedometer, which is a member of the H. W. Johns-Manville Company's auto accessory family, was official recorder of the Dreadnaught Tire Test run, from "New York to San Francisco and return," fathered by the Dreadnaught Tire and Rubber Company. The trip involved a run of approximately 10,000 miles. Tests recently made at the Columbia University demonstrate that fluctuation of the Jones instrument, owing to temperature changes, is almost imperceptible.

PAPERS TO BE READ AT THE S. A. E. SUMMER MEETING

Details and Discussions in Our next Issue

In view of the fact that the S. A. E. Summer Meeting takes place June 14th to 17th, and inasmuch as the forms of this publication will be off press before that time, it will be impossible for us to report this meeting in the current issue. However, in our July issue, we shall publish a complete review of the meeting with extracts of the papers which are of special interest to the commercial car industry.

Papers scheduled for the meeting are as follows:

Automobile Clutches—W. F. Herst.
Size and Inflation of Pneumatic Tires—P. W. Litchfield.
Spiral Type Bevel Gears for Automobile Drives—A. L. Stewart.
Aluminum Alloy Pistons—Eugene Gruenewald.
Automobile Lubrication—C. W. Stratford.
Farm Tractors and their Motors—Philip S. Rose.
Spring Design—C. H. Gleason.
Pressed Steel Wheels for Pleasure Cars—Orrel A. Parker.
Aeroplane Engines—Neil MacCoull, Jr.
Motor Fire Apparatus—Joseph A. Anlada.
A Type of Truck for Military Service—Jerry W. DeCou.
Increasing Truck Efficiency with Trailers—A. R. Miller.
Road Tractors—Frank H. Trego.
Rational Method of Determining Mileage of Electric Vehicles—T. H. Schoepf.

The reports to be submitted are as follows:

Seventh Report of Iron and Steel Division of the Standards Committee; Sixth report of Carburetor Fittings Division of the Standards Committee; Sixth Report of Miscellaneous Division of the Standards Committee; Fourth Report of Springs Division of the Standards Committee; Seventh Report of Electrical Equipment Division of the Standards Committee; Second Report of Electric Vehicle Division of the Standards Committee.

MODEL CHICAGO TRUCK ORDINANCE

Chicago, Ill., has a model ordinance respecting the sizes, weights and speeds of motor trucks which may well receive the earnest consideration of cities about to regulate the size of these vehicles. The portent of the proposed ordinance follows:

It permits tractors and trailers up to 40 ft. in length, 8 ft. 6 in. in width, and 9 miles per hour in speed. Longer tractor-trailer trains are permitted to operate on rails, with permission to lay them being obtained, or the street railway's permission to use its tracks. One hundred-foot trains are allowed during the night hours.

Trucks may be 40 ft. long and 8 ft. 6 in. wide, but with defective tires, they may not go more than 4 miles per hour. Cleats or projections other than tire chains when need arises, are not countenanced. Loads may not project more than 4 ft. back, nor tow-lines be over 16 ft. long.

Weight on all vehicles is limited to 1000 lbs. per tire-inch, 24,000 lbs. per axle and 30,000 lbs. total. Rubber tires are obligatory. The law does not specifically state that the tires of trailers must be of rubber.

The Republic Truck Company has decided to stay in Alma, Mich., as the Board of Trade of that city has voted to raise $35,000 for a new building, which the company demanded under a threat to remove to either Saginaw or Kalamazoo. The company employs three hundred men and is working 24 hours a day in the machine shops with corresponding long overtime in other departments.

SAFETY FIRST
TEN COMMANDS FOR MOTORISTS
All fires are small fires at first
Have you ever - seriously considered the effects of a fire in YOUR home?
DISASTER WITHOUT PYRENE
Pyrene
KILLS EVERY KIND OF FIRE
SAVES 10% ON AUTO INSURANCE
Pyrene FIRE EXTINGUISHER

Pyrene Manufacturing Company Mechanical Window-Display

The Pyrene Manufacturing Company has just distributed among its dealers a few hundred moving window-signs, which have more action than a "movie." The sign is a large, mechanical one, with a big, broad arrow on top, swinging from side to side, while below there is portrayed on one side a disastrous fire, with the firemen hacking at the window, the smoke rolling out in clouds, and a home being burned up rapidly. On the other side, the display shows a home which is Pyrene protected; the lady of the house easily puts out the fire, at the beginning, with the convenient, light and efficient Pyrene Fire Extinguisher.

The CCJ has most advertisers because it gives them biggest returns

Personal Items

C. C. Kriedeman, has become superintendent of the Standard Motor Truck Company, Detroit.

C. S. Goan has become president of Berry Brothers, manufacturers of varnish, Detroit. He succeeds Frank W. Blair.

H. C. Palmer has become sales manager of the Standard Motor Truck Company, Detroit. He formerly handled the De Dietrich car in Boston.

E. R. Lightcap, president of the Packard Motor Car Company, Chicago, and the Federal Motor Truck Company, Detroit, died on May 31st from pneumonia.

J. J. Alvin, general sales manager of the Sears-Cross Speedometer Company, of Detroit, has resigned to open an office as general manufacturers' agent, in Detroit.

J. D. Anderson, formerly general sales manager of the United States Tire Company, has become affiliated with the Fisk Rubber Company, Chicopee Falls, Mass.

Alex Schwalbach, who recently resigned the position of advertising manager of the Bearings Company of America, has become advertising manager of the Emil Grossman Manufacturing Company.

Vincent Link; for several years truck engineer for the Packard Company, has taken charge of the engineering and drafting departments of the Standard Motor Truck Company of Detroit.

Thomas P. Phillips, formerly editor of the house organ of the Burroughs Adding Machine Company, has become advertising manager of the truck department of the Packard Motor Car Company.

H. G. Fitler, formerly sales manager of the Quaker City Rubber Company, has been appointed manager of the Swinehart Tire & Rubber Company, with headquarters at 320 N. Broad Street, Philadelphia, Pa.

P. E. Reiners, formerly associated with the Triple Action Spring Company, has been placed in charge of the Chicago branch of the Auto Devices Manufacturing Company, Milwaukee, at 2023 S. Michigan Ave.

E. A. Kelly, who was formerly with the Chicago branch of the Splitdorf Electrical Company, has been appointed factory representative of the same company, with headquarters in Detroit. He succeeds C. E. Brelsford, resigned.

H. B. Daniels, for some time connected with the J. I. Case Threshing Machine Company's St. Louis branch, has been appointed district sales manager for the Velie Motor Vehicle Company, with Illinois and Iowa as his territory.

E. T. Birdsall, for several years connected with the Detroit Section of the S. A. E., as chairman, has retired and has been succeeded by George H. Dunham. Mr. Birdsall was presented with a handsome silver cigarette case lined with gold as an expression of esteem from friends in the Detroit section.

Alvan McCauley, vice-president and general manager of the Packard Motor Car Company, has been elected to the board of directors, succeeding J. W. Packard, of Warren, Ohio, inventor of the first car of that name. While Mr. Packard retains his financial interest in the company, he retires from the directorate to devote more time to other pursuits.

E. E. Westman, formerly purchasing agent for the Premier Motor Manufacturing Company, Indianapolis, Ind., has severed his connection with that company to embark in the wholesale accessory business for himself under the name of the Standard Bearings and Parts Company, with headquarters in Indianapolis.

Harry H. Stoops, founder of the American Cyclecar Company, Bridgeport, Conn., has become a member of the Vanguard Manufacturing Company, Detroit, maker of windshields.

J. M. Studebaker, Sr., last of the Studebaker brothers, who founded the Studebaker Corporation, has retired as chairman of the board of directors, and will become honorary president of the concern. Frederick S. Fish, president, has succeeded to the office of chairman of the board of directors. A. R. Erskine, 1st vice-president, has become president and the office of vice-president will be abolished.

Kelly-Springfield Motor Truck Company, Springfield, Ohio, recently elected the following officers: L. J. Geddes, president; Captain McMillin, vice-president; J. M. McCarthy, 2d vice-president; G. M. Barden, secretary-treasurer; C. W. Young, assistant secretary, and C. N. Jellisse, assistant treasurer. These officers, with the following comprise the board of directors: A. P. Lathrop, C. S. Kelly, J. B. Cartmell, H. E. Freeman, and C. L. Bauer

Changes and Factory News

Federal Motor Truck Company, Detroit, Mich., has increased its capitalization from $200,000 to $500,000.

Master Carburetor Company, Woodward and Hancock Avenues, Detroit, Mich., moved to new factory at 1523-31 W. Fort Street.

Beach Creek Truck & Automobile factory, Beach Creek, Pa., is being erected. P. J. Smith is general manager of the company.

Russel Motor Axle Company, North Detroit, Mich., erecting addition to plant, which, when completed, will be 120x120 ft

Federal Radiator Company is now using the old plant of the Penn Motors Company, at New Castle, Pa., for the manufacture of radiators.

Humboldt Machine & Stamping Company, 213 W. 40th Street, New York City, moved to Vernon Avenue and 109th Street, Long Island City.

Gabriel Horn Manufacturing Company, Cleveland, Ohio, has changed its name to the Gabriel Manufacturing Company in order to make its name more expressive of its products.

Mogul Motor Truck Company, 6100 Maple Avenue, St. Louis, Mo., has purchased a tract of land on Forest Boulevard, between Sarah Street and Boyle Avenue, as a site for its new factory.

McGraw Tire & Rubber Company, East Palestine, Ohio, at the May meeting of the board of directors, declared a semi-annual dividend of 5 per cent. on the common stock, payable June 1st.

Breese, George A., who has had the Zephyr carburetor manufactured for him by the P-R Manufacturing Company, Detroit, has sold the manufacturing rights in that instrument to the P-R Company.

International Motor Company is enlarging its Plainfield, N. J., plant by the erection of a building 120x120 ft. and the extension of the power house 30x60 ft. Other additions are being made to the various other structures.

Bollstrom Products Sales Company, Battle Creek, Mich., will place a new line of cars on the market this fall, which will have an improved four-wheel drive. The promoters claim that a six-cylinder engine will develop more power on the four-wheel drive than eight cylinders will on the old style transmission of power to the rear axle only. The Bollstrom Products Sales Company, Battle Creek, Mich., is the general sales agent.

Champion Ignition Company, Flint, Mich., manufacturer of the A C, A C Titan and the A C Cico spark plugs, is erecting a building which will give an additional 18,000 sq. ft. The output of the factory will be increased to 50,000 plugs per day.

Motsinger Device Manufacturing Company, Lafayette, Ind., increased its capital stock from $150,000 to $300,000. The stock is all common, the company having no preferred shares. The additional capital will be used in extending the sale of the Motsinger Carburetor.

Independent Motors Company, Port Huron, Mich., formerly the Cass Motor Truck Company, has increased its capital stock from $60,000 to $120,000. The company is building the Cass one and a half ton truck and the Independent 1000- to 1500-lb. worm-drive truck. The output of the factory will be increased to meet the demand.

Four-Wheel Drive Auto Company, Clintonville, Wis., is erecting a large addition to its present factory. The new building will be placed on the company's property adjoining the present plant, and will cover an area of 100 x 185 ft. Additional machine shop facilities are being added, covering a like space of ground. Day and night forces have been working for several months.

The Philadelphia Branch of the Polack Tyre & Rubber Company has just moved from 1803 Market Street to its new and more commodious quarters at 1906 Market Street. This change was necessitated by an ever-increasing business, and the new quarters have every up-to-date facility for handling the tire business, including the largest hydraulic tire press in the city, having a capacity of 250 tons.

American Piston Ring Company is now occupying its new plant just completed at 704 S. 11th Street, Newark, N. J. The plant is complete in every detail, providing special comforts for the workmen, overhead lighting, special mechanical ventilation, shower baths and rest rooms. The company is running night and day to supply the demands of its rapidly increasing trade, which includes such firms as Pierce-Arrow Motor Company, International Motors Company, Winton Motor Car Company, Fiat and others.

The New Process Gear Corporation, Syracuse, N. Y., has entered into a contract with the Gearless Differential Company, Detroit, to manufacture the Bailey gearless differential for the general automobile trade. The New Process Corporation will immediately inaugurate a thorough campaign to interest manufacturers, a number of whom have already arranged for tests. The parent company will continue its present policy of going after the replacement business on cars already in service. All correspondence from dealers should continue to be addressed to the Gearless Differential Company, 864 Woodward Avenue, Detroit.

Bingham Manufacturing Company, West Park, Ohio, manuafcturing auto trucks and carburetors, has made an assignment.

Wilcox-McKim Company, Saginaw, Mich., maker of automobile parts, filed a voluntary petition in bankruptcy. Liabilites, $16,000; assets, $24,000. A reorganization is planned.

White Company, Cleveland, Ohio, recently received an order for 300 automobile tank trucks for the use of the Russian army in supplying the thousands of automobiles in gasoline. The tanks have a capacity of 1200 gallons of gasoline and 300 gallons of oil. The company recently filled a similar order for the French government.

The CCJ has most readers because it gives most information

CHICAGO NEWSPAPER ORDERS FLEET OF REPUBLIC TRUCKS

By WALTER A. BERMINGHAM

THE "Daily News" of Chicago, one of the greatest evening newspapers in the country, after an 8 years' experience with motor trucks in their circulation department, have found them a necessity for speed and reliability for delivering their enormous circulation of several editions daily, and have reached the conclusion that standardization of equipment is for efficiency for their motor truck service. They have therefore recently placed an order with the Republic Motor Truck Company, Alma, Mich., for twelve, three-quarter ton and three, one and a half ton Republic Motor Trucks; although four of these trucks are now in commission they have been in use such a short time that no efficiency figures are available.

The Republic Motor Trucks are fitted with Torbensen Internal Gear Drive Rear Axles, making a rear end solid bridge construction; Continental engines, Bosch Magnetos, A. O. Smith frames, and all parts from material designed and tested for the most arduous work expected from motor-driven vehicles.

The "Daily News" garage is a complete one, as their machine shop is equipped with tools for any emergency and duplicate units of all parts have been kept in stock, with a corps of machinists steadily employed; all bodies are built and painted in the plant.

The investment represents over $125,000. Standardization will mean less parts necessary in stock, and experience has taught them the type of motor truck necessary for economy, durability and reliability for a rapid newspaper delivery service.

Their principal difficulty in the past has been rear end construction, which they believe will be obviated by the straight drive from the engine to the rear system. The Republic Motor Trucks will all be equipped with especially constructed Swinehart tires, and, while they will be of the same composition as the regular motor truck tire of this type, they will be nearly an inch higher and with a wide base for the purpose of doing away with any side action.

Their motor delivery service for the past year was operated at a cost of $.1304 per mile. The cost of delivery for each single copy of the "Daily News," a newspaper averaging twenty-four pages and probably the largest evening daily, 308 days or 1 year, $.54, with deliveries from the circulation department ranging from packages as small as four or five to those of five or six hundred copies. The service is strenuous, as loads vary, overloading often happens, it is a rapid service, and the quick starts and stops are most severe on the rear axles. One hundred tons of newspapers are hauled every day and a 100-mileage record is not unusual for any unit of the motor truck equipment.

The "Daily News" motor truck department motor delivery service now includes thirty-four vehicles, fifteen Republics, fourteen (new) Hupps, capacity 800 to 1000 lbs. and five two-ton Packards.

A Fifteen Hundred Pound White Used by New York Provision Merchant

Truck for News Service

One of the fleet of fifteen hundred pound Republic trucks fitted with Torbensen internal gear axles, in use by the Daily News, of Chicago. Some of these cars are making daily, one hundred miles, 100 tons of paper being delivered daily at a cost of $.1304 cents per mile.

Gramm-Bernstein Company, Lima, Ohio, has received an order to duplicate at once the large number of commercial cars which were being sent to England, and which were lost when the Lusitania was sunk.

The Lupschultz bill was defeated in Harrisburg, Pa., on May 27th. This bill provided for increases in motor car license fees. The House finally killed the bill after amendments which cut down the proposed increase to about 25 per cent.

The National City Bank, of New York, has made arrangements through its South American branches to establish the dollar in Argentine and Chile. It seems probable that the American dollar may become preeminent internationally through the intervention of bankers, shippers, manufacturers and importers.

Governor Whitman, of New York, has vetoed the Hewitt bill which proposed placing a registration horsepower tax on commercial cars in New York state. It was brought out that the excessive taxation upon commercial cars and motor 'buses were prohibitive, and that it was so loosely drawn that renewals would not have been necessary, and thereby the state would have lost $1,500,000 annually from registration fees of automobile owners.

Lippard-Stewart Motor Car Company, Buffalo, N. Y., has announced a reduction in its price schedule for the Lippard-Stewart 1500-lb. capacity delivery trucks as follows: 1500-lb. chassis, bevel drive, pneumatic tires, $1500; 1500-lb. chassis, worm drive, pneumatic or solid tires, $1600. There will be no change in the mechanical construction of these models, and the reduction is the natural result of increased business, and a consequent lowering of manufacturing costs.

The German government is already planning how used trucks will be taken care of after the war is over; and a special company will be organized in Berlin to take over those vehicles which are in need of repairs, gradually put them back in condition, and sell them at no profit, in such small numbers as not to affect the market. The veteran trucks will be retained for military service. The trucks will be divided into three divisions—veterans, or those in good condition; those that have been damaged but are susceptible to repair; and those which are only fit to be sold for scrap.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

THE COMMERCIAL CAR JOURNAL

Entered as second-class matter at the Post Office at Philadelphia, Pa. under the act of March 3, 1879

Vol. IX. PHILADELPHIA, JUNE 15, 1915 No. 4

Published the 15th of each month by the

CHILTON COMPANY

Market and 49th Streets Philadelphia, U. S. A.

JAMES ARTMAN, President C. A. MUSSELMAN, Treas. and Gen'l Mgr.
GEO. H. BUZBY, Vice President A. H. VAUX, Secretary

ADVERTISING DEPARTMENT

Eastern Mgr., C. MONROE SMITH, New York Western Mgr., C. C. McKINNEY, Chicago

EDITORIAL DEPARTMENT

JAMES ARTMAN, Editor-in-Chief E. S. FOLJAMBE, Managing Editor
ALBERT G. METZ, Ass't Managing Editor

ASSOCIATE EDITORS

J. HOWARD PILE JAMES C. GALLAGHER

SUBSCRIPTION RATES

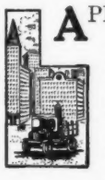
United States and Mexico.....One Year, $1.00
Other Countries in Postal Union, including Canada.....One Year, $2.00

Make checks, money orders, etc., payable to Chilton Company

Change of Address — Subscribers desiring their address changed, should give the old as well as the new

The Commercial Car Journal is a Member of the Audit Bureau of Circulations

DEMAND INCREASING FOR SMALL HEAVY-DUTY COMMERCIAL CAR ENGINES AND SMALL TRUCK AXLES, VERY FEW CATERING TO THIS FIELD



APPARENTLY the engine makers with but few exceptions have been giving but slight attention to a field for their output, which has already reached a point of considerable demand, and which within the next few years is destined to increase very rapidly. We refer to the requirements of light truck or delivery vehicles, cars of from six hundred to fifteen hundred pounds capacity.

Small Trucks a Quantity Product

The manufacturers of complete vehicles are realizing more and more our contention that one of the chief difficulties which must be overcome by the truck industry is that of supplying in adequate numbers small, serviceable trucks. More and more makers are coming into this field, and as the production of these small cars is a quantity proposition, there will doubtless be a tremendous increase in the number of such trucks built within the next few years.

We are told by the makers that it is difficult to secure a strictly commercial car engine of small proportions built especially for such service. Designers are gradually getting away from the use of pleasure car parts for these small trucks, and there is already a fair demand for real truck engines of small dimensions.

Industry Dwarfed by Pleasure-Car Comparisons

Unfortunately for the truck industry nearly all the parts and accessory manufacturers compare the possible present volume of sales to truck makers, with the possible volume of sales to pleasure car makers. This naturally dwarfs the truck industry, which, if alone and not overshadowed by the pleasure car business, would be considered, and in reality is, a very large business, and one which is growing tremendously.

Have you ever stopped to consider the possibilities of this small car field? Statements are often heard that the truck business will be greater than the pleasure car business has ever been. This we do not question. Therefore, when it is realized that 75 per cent. of this truck business is the legitimate field for cars of small capacity, some idea may be gained of possible future sales. Now is the time for the engine manufacturer who desires to profit by this future business to get in the entering wedge by putting on the market as soon as possible real truck engines of small size.

Small Truck Axles Needed

Rear axles. Many of the parts of these small trucks have of necessity been pleasure car parts rather than true commercial car units, owing to the lack of special parts for such capacity vehicles. This is especially true of the rear axle unit.

There are certain worm gear rear axles of small size, giving 6 or 8 to 1 reduction, but there is also a demand for axles of other types and these do not seem especially to be on the market.

When it is considered that these cars must sell for in the neighborhood of $700, the manufacture of suitable and staunch parts becomes a problem, but one which is solvable and apparently profitable.

The few makers who are already catering to this field are having difficulty in keeping up with their orders. This condition is going to be even worse in the near future unless axle manufacturers take steps to provide for the quantity production which is sure to take place in this size unit in the near future.

MOTORIZATION OF UNITED STATES ARMY PROBABLE

IN OUR July, 1914, issue, just before the European war began, we called attention to the marked deficiency of the United States Army as regards motor truck equipment. At that time we outlined the need for motorizing the army in its various branches as a means of economy, if for no other reason.

Army officials have been watching very closely the progress of trucks in the war zone, have been studying military tractors and motors for hauling artillery, baggage trains and special heavy equipment such as necessary in the field, and as never before have been made to realize the deficiencies in this respect of our small standing army. Here we are the nation which is supplying the motor equipment for the armies of the world practically without any for our own army.

It can hardly be possible that after the lesson which the war is teaching, the United States will continue to haul her heavy equipment by the antiquated mule method. The need for supplying commercial car equipment for the army is more in evidence in this country than in almost any other, as there are no subsidy arrangements, and it is impossible in time of stress for the Government to call upon the motor equipment already in use by merchants.

The experience which our makers are gaining by supplying motors for the warring nations should surely enable them to provide for Uncle Sam as efficient and serviceable devices as any now in use in the war zone. For the above reasons it is believed a gradual motorizing of the entire army equipment may be looked for in the near future.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

Steel and Rubber Markets

FOREIGN BUYING MAIN FACTOR IN STEEL TRADE

The heavy buying of steel products by foreign countries is responsible for the activity in the steel mills. The United States Steel Corporation is operating between 75 and 80 per cent. of total capacity. Domestic trade in railroad and bridge building is not encouraging. The greatest activity is in steel cars and pipe.

Quotations on June 10th were:

STEEL PRODUCTS PRICES

Bessemer steel, per ton, mill	19 00	a	20 00
Open hearth, per ton, mill	19 00	a	20 00
Sheet bars, per ton	20 00	a	22 00
Steel bars, soft base, half ex-tidewater	1 36	a	1 41

The above prices are at tidewater in carloads and larger lots. For quantities less than 2000 lbs., but not under 1000 lbs., $2 per ton additional is charged, and less than 1000 lbs., $8 per ton additional.

SHEETS

The following prices are for 100-bundle lots and over f. o. b. mill; smaller lots $2 per ton higher.

Gage—	Black	Galvanized.	Gage—	Black	Galvanized.
Nos. 22-24	1 55	3 80	No. 28	1 70	4 25
Nos. 25-26	1 60	3 95	No. 29	1 75	4 40
No. 27	1 65	4 10	No. 30	1 85	4 60

IRON AND STEEL AT PITTSBURGH

Bessemer iron, Valley furnace	13 75	a	.. ..
Bessemer steel, f. o. b. Pittsburgh	20 00	a	21 00
Skelp, grooved steel	1 12½	a	1 15
Skelp, grooved iron	1 50	a	.. ..
Ferro-manganese (80 per cent.) seaboard	90 00	a	100 00
Steel, melting scrap	11 75	a	12 00
Steel bars	1 20	a	1 25
Black sheets, 28-gage	1 70	a	1 75
Galvanized sheets, 28-gage	4 25	a	4 30
Blue annealed, 10-gage	1 30	a	1 35
Tank plates, ¾ and heavier	1 15	a	1 20

CRUDE RUBBER STEADY

Up-river fine has advanced to 62 cents. Purchasing is still continued along conservative lines and for immediate consumption only.

Quotations on June 10th were:

Up-River—			
Fine	62	a	..
Coarse	47	a	..
Island—			
Fine	53	a	54
Coarse	30	a	..
Cameta	32	a	..
Caucho Ball—			
Upper	49	a	..
Lower	Nominal		
Centrals—			
Corinto	44	a	45
Esmeralda	44	a	45
Gautemala slabs	42	a	43
Mexican—			
Scrap	43	a	44
Strips and scrap	43	a	..
Guayule	..	a	..
Guayule		a	..
Balata—			
Balata sh't	53	a	58
Ciudad—			
Ciudad, b'k		a	..
Trinidad—			
Trinidad, b'k	Nominal		
Africans—			
Massai, red		a	..
Red C'go	Nominal		
B'k C'go		a	..
Soudan—			
Niggers	Nominal		
Gambia, prime		a	..
East India—			
Smk. sh'ts	62½	a	63
Ceylon—			
Bis and sheets	61	a	..
Pale crepe	62	a	..
Pontianac—			
Prime plantation		a	..
Palembang	..	a	..

DOMESTIC SCRAP RUBBER

Tires—			
Automobile	4¾	a	..
Bicycle, pneumatic	3	a	3¼
Wagon and carriage, solid	4½	a	..
Inner tube	12	a	14

ROAD DIFFERENCES AFFECT TIRE MILEAGE

European Tire Mileages Much Greater Than American, Due to Road Conditions

The remarkable mileages reported for London omnibus solid tires as compared with average tire mileage in this country is very noticeable.

On this subject, the Polack Tyre & Rubber Company report as follows:

American roadways are steadily, if slowly, improving, but it's a long, long way from our roads and streets to the comparative perfection of the roadways of England and some of the other European countries. Some American motor truck users who are content if their tires exceed the guaranteed 7000 or 10,000 miles and who feel tempted to write to the papers about it if a tire or two hangs on for a full 20,000, might not feel quite so philosophical about the condition of our streets and roadways if they realized that motor truck tires have English records extending from 30,000 to 50,000 miles!

Of course, the advocates of the European type of tire will point out that such records as the above can be made only by that type and cannot be expected from the smaller bulk of rubber contained in the American profile tires—but on the other hand it is more than doubtful that any type of tire, American or European profile, has ever achieved such longevity in this country.

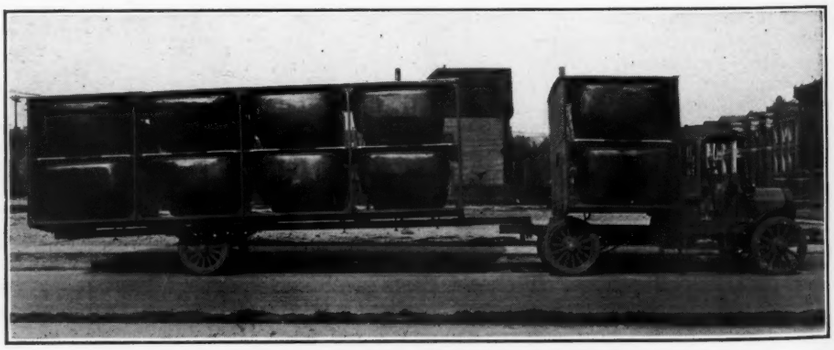
Records of 30,000 miles or anywhere near 30,000 miles are, however, decidedly exceptional in this country, whereas in England records of upwards of 30,000 miles are not rare by any means. The heavy motor stages of the London General Omnibus Company manage up to 35,000 miles at times, and Waring & Gillow, Ltd., London, have actually achieved 50,000 miles on English roads with a lighter type truck, of course.

It is doubtful that the London omnibuses or the Waring & Gillow light truck could achieve tire mileages anywhere in this country, much exceeding half their respective English figures—and this quite irrespective of the type or profile of tire employed.

However, Alexander Campbell Milk Company, Brooklyn, reports on six Polack European profile tires which averaged 20 months and 23,350 miles each, one of the six tires actually achieving 33,000 miles. Another Polack enthusiast, in Rhode Island, claims 32,000 miles and still running, for a tire on his five-ton truck; while its running mate is stated to have ended its career prematurely at 19,000 miles, by happening to be in advance of the rest of the truck when the latter plunged over a 10 ft. embankment.

TRUCK AND TRAILER FOR DELIVERING BODIES

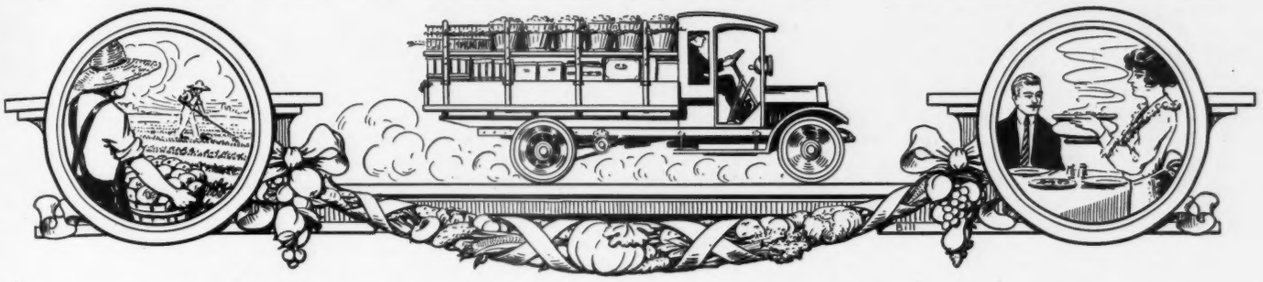
One of the many novel trucks running round the streets of Detroit delivering bodies and material to the automobile plants is a Wilson chassis, made by the J. C. Wilson Company, Detroit, Mich., with a huge trailer designed by G. E. Porter, and manufactured for the Fisher Body Company by the American Car and Foundry Company. This novel combination of truck chassis and trailer carries ten completed bodies at one time, two on the truck chassis back of the driver and eight more on the trailer. They are arranged in double-deck fashion and the big truck and its trailer travels right along at a speed oftentimes reaching 18 miles per hour. In the day's work this Wilson covers 90 miles, making five round trips daily to the plant of the Hudson Motor Car Company. At no time has it gone wrong, and the Fisher Company has set the pace for other body manufacturers who are dickering for a like outfit. The Fisher Company with horses had been able to make but two trips daily, and the hard work of 36 miles per day was costly in horse flesh in addition. The one and a half ton Wilson has carried on the work with clock like precision ever since it was put into commission.



Unique Outfit Used by Detroit Body Maker

The CCJ leads in circulation, advertising and prestige

FROM FARM TO TABLE



Specific Instances Showing How Commercial Cars Are Solving the Great Problem of Food Supply for the Congested Centers of Population

By E. S. FOLJAMBE

FIVE billion dollars is the estimate placed by the Department of Agriculture on the principal farm crops of the United States for the year 1914. This is $104,000,000 more than the value of the crops of 1913, which is a most remarkable showing considering that the Southern farmers' loss on cotton alone is estimated at $418,000,000. The potato crop for 1914 was the second largest ever produced, while the wheat and corn crop broke all records. All of this food supply must be moved and moved quickly, as a large percentage of it is perishable.

The farmer of to-day is an educated, intelligent business man, who makes use of modern appliances and knows how to carry on intensive farming. Intensive methods require improved means of transporting the product to the railroad or to the center at which it is marketed. As the centers of population increase in numbers and each in magnitude, the problem of food supply to these congested districts becomes greater each year. The perishable food stuffs, including market garden products, dairy products, and meat, require rapid and protected transportation methods. This speed and protection the motor-driven truck offers, and is the only transportation vehicle that seems to fulfill all the requirements. Refrigerated motor cars are becoming more common, companies are forming to handle, during the season, the produce for entire districts of small truck gardeners, while larger and more prosperous suburban farmers own and operate their own machines for rapidly carrying produce to the city markets. Creameries now gather the milk over an extended territory by trucks, transporting it rapidly to their central butter and cheese-making plants. Farmers living at a distance from the nearest railroad station are enabled to market their milk without undue exposure to the sun by waits on platforms at railroad stations as outlined later on in the "Baby First" campaign.

Saving of Thirty-Six Per Cent by Trucks

That trucks are not only better than horses, but more economical is daily being demonstrated by truck gardeners and farmers, city produce merchants, and dairymen throughout the country. Here is what the Chicago Municipal Market Commission has to say on the subject:

"The city consumer pays an average of $1.90 for produce that the farmer sells for $1. It cost more to haul 100 lbs. of potatoes, fruit or other farm products 5 miles from the docks to the city consumer or the retail store than to ship them by boat from Michigan to Chicago.

"About 1000 teams are engaged in hauling food products, exclusive of the delivery service of the retailers, and, to make a profit for their owners, single teams must earn about $6 a day and double teams $8.

"Team hauling is decidedly antiquated, wasteful and inadequate," observes the report. "Because of the congestion existing in the streets of the central business district and the consequent inadequacy of the streets to afford free passage to vehicles, the average wagon or truck spends about one-third of its time actively hauling commodities and two-thirds in waiting, unloading and in delays to traffic.

"Animal transportation is out of place and an archaic survival. Under present methods of hauling, food products are invariably exposed for hours to the heat of the sun. The motor truck as a carrier of food products assures to the consumer better food, lower prices, and a lower cost of hauling. Detailed comparisons showing the cost of hauling by horses and wagons and motor vehicles indicate that the average cost of hauling in the city by motor is 11¼ cents per ton mile as compared with 17¾ cents by horse, a saving of 36 per cent."

The proposed central stations with substations throughout Chicago for the distribution by motor trucks of food products, is a sign which indicates the progressive wind of modern motorized methods.

What a Railroad Report Showed

Not only is the truck displacing the horse in city transportation of food, but is also taking the place of the electric interurban lines and even the railroads. A specific case will illustrate this point. The traffic manager of a railroad operating out of Portland, Ore., sent in his report. The stockholders mostly in the East noted a decided falling off in freight business to points up to 40 miles distant from the city, while business outside of that zone was constantly increasing. In a subsequent report which included a district map it was plainly shown that the business was falling off because of the fact that one company alone was operating 20 motor driven trucks, making scheduled daily trips to the farming centers around Portland. This railway is still fighting to get the business, but trucks are daily increasing, picking up farm produce and carrying consignments of city goods to the farmer on outgoing trips. The farmers leave this produce at the front gate in the early morning, and the trucks pick it up. Freight from the city is also left at his door, thus eliminating the haul to and from the railroad depot. The service is direct, which means speed, fresh farm products and prompt delivery. Already the competition has become so keen that one of the railways has closed its freight stations within the 25 mile limit.

Land Values Increased

There was a time when the value of a farm depended almost entirely on its nearness to the market or shipping point. Now the markets are being brought within range by means of automobile transportation and more land made available.

Not only are motor driven vehicles being used for the direct transportation of foodstuffs, but they find just as much of a field of usefulness on the farm. In the gathering of the produce, and in the numerous capacities formerly occupied by horses, in the rapid carrying of peaches, tomatoes and other products which are canned, the truck has made it possible to eliminate a tremendous waste and loss in handling. One hundred bushels of wheat or potatoes is now carried to the railroad station 5 to 10 miles distant, and fertilizer, lime, feed, lumber, etc., brought back with the same facility with which formerly 20 bushels were carried, and in one-fifth of the time.

Roads the Only Drawback

Roads have much to do with motorizing the farm and produce haulage. This is nowhere more clearly shown than in the

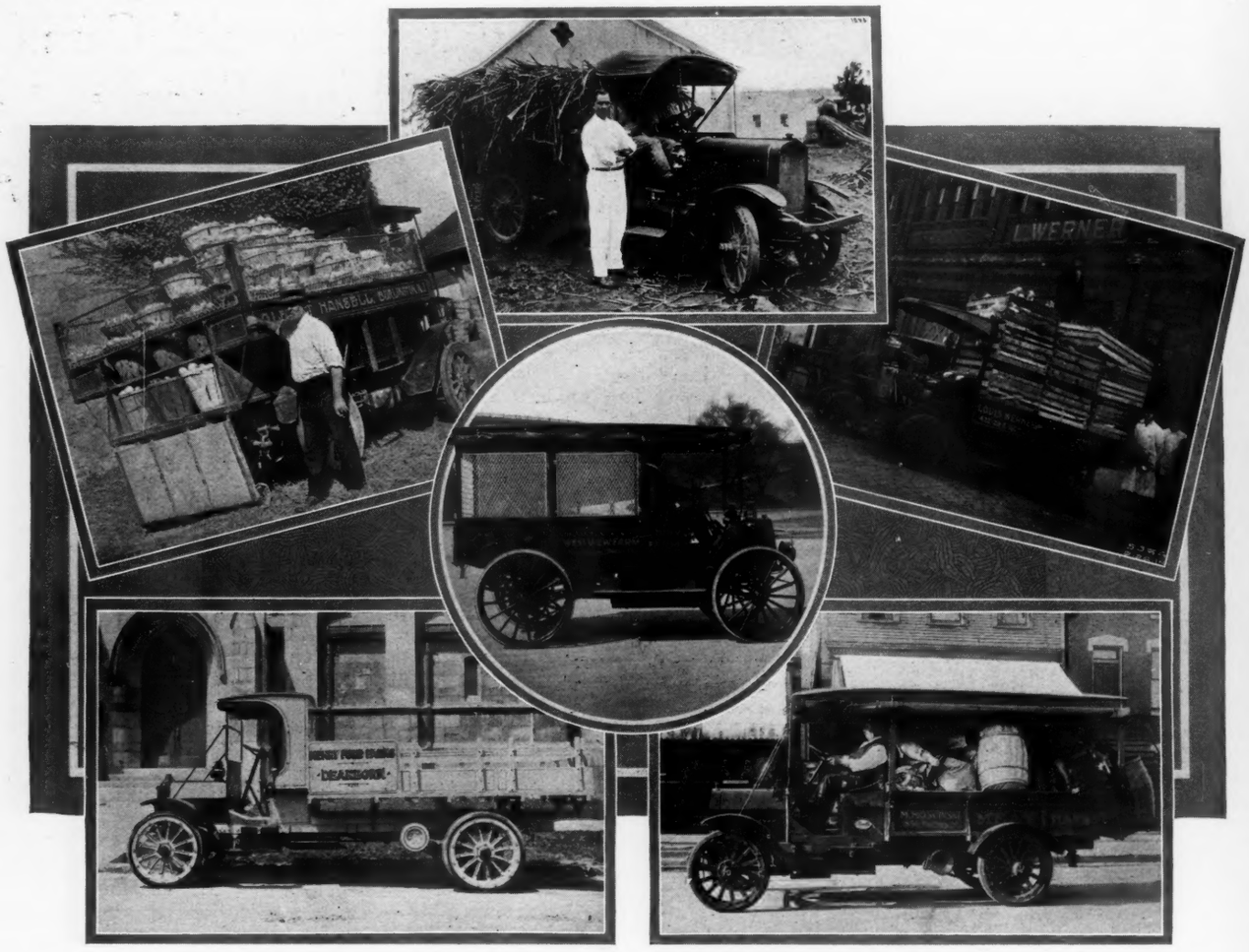
The CCJ has most advertisers because it gives them biggest returns

vicinity of Philadelphia. The entire country surrounding the city is fertile and suitable for market gardening, yet fully 80 per cent. of the products brought to the Philadelphia market come from Jersey. The reason for this is because Jersey has good roads, while Pennsylvania roads are notably bad. It is easier to bring produce 50 miles from Jersey than 20 miles from the Pennsylvania side. The extent to which trucks are already in use for this purpose is borne home to one who will take the trouble to be early at the ferries on the Camden side, and see the line of produce laden trucks waiting their turn to cross the Delaware to the big Philadelphia markets.

If one will get up even earlier and follow the White Horse Pike into Camden, he will see hundreds of teams, for it must be recognized that more teams are still used than trucks, with their weary drivers slowly making their way to the ferries. Some of these wagons come from distances up to 25 miles, which means practically an all-night trip, and the poor farmer who has worked all day getting the shipment ready often has to drive the greater part of the night, catching catnaps while his assistant takes the reins. It is drudgery of the worst kind, but this is absolutely necessary if horses are used. The only relief is the motor truck.

Truck Turns Loss Into Profit

Take for example one case of a man who on account of financial reasons purchases a piece of land about 26 miles from Camden, which he could get for $100 per acre instead of $300 per acre, the cost of land near Camden. He had a beautiful piece of ground, but had to solve the transportation problem. The nearest railroad station was 7 miles away. He attempted to deliver to Camden (26 miles) by a two-horse team. The wagon had to be loaded at 3 o'clock Friday afternoon for the drive to Camden, allowing for stops to rest and feed the horses required 8 hours. He reached his destination at midnight. After allowing time to cross the ferries and unload, he did not get back to Camden until 1.30 in the morning, when both men and horses had to rest, before the return trip. He reached the farm at noon the next day, tired out, having been away fully 20 hours, and with only 3 to 4 hours' sleep. At last he gave it up as impractical. The berry season coming on, however, induced him on account of the perishableness of the goods and the profit to be made if an early market could be had, to purchase a truck. The old 20-hour trip was immediately reduced to 5 or 6 hours. During this particular strawberry season running the truck at night he was enabled to make three trips in 16 hours, the distance covered being 156 miles. Two hundred and forty crates of berries, weighing 54 lbs. to the crate, a total of 12,960 lbs. were moved. The three trips were made in 4 hours less than one trip could have been made by horses. In 11 months this farmer covered 12,000 miles with his truck, and in addition to the profits realized on his berries, made considerable money hauling produce for other farmers in the vicinity.



Group of Motor Trucks Hauling Produce

At top, a Kissel truck in Hawaii; at right and left, Auto cars loaded with poultry and fruit; at center, International truck used at West View Dairy Farm, Pa.; lower right, Republic truck used by Moscinski Market; and lower left, a Federal truck used by Henry Ford on his own farm

From $75 a Week to $150

J. S. Shoemaker, 210 Market Street, Philadelphia, is operating a Rowe truck, which has been dubbed "The Shoemaker Express." He hauls for truck farmers in Jersey, making an average of about 50 miles per day, carrying asparagus, potatoes, berries and vegetables, but he does not return empty. He makes the truck pay by carrying from Philadelphia to the merchants of

The CCJ has most readers because it gives most information

Swedesboro, N. J., all kinds of freight and merchandise. This truck has displaced 6 horses. He now leaves Swedesboro at 7 o'clock in the morning, where he formerly had to leave at 4 or 5 o'clock, and leaves Philadelphia at 2 p.m., arriving home at 5 or 6, where formerly he left Philadelphia at 2, arriving between 8 and 9 o'clock. This three ton truck with two men not only displaced 6 horses, but he formerly had to hire 5 men beside himself. As a result of using the truck his income has jumped from $75 a week up to a minimum of $150.

Trucks Busy on Long Island

Long Island is also the scene of much truck farming and produce hauling by commercial cars. John A. Jantzen, of Hicksville, has been hauling from his farm for many months with a three-ton Mack. He now makes the trip of 28 miles to New York City in 2½ to 3 hours. Formerly 9 to 10 hours were required with horses.

Joseph Navratil, of Jericho, L. I., is using a five-ton Mack for the same kind of work. He makes one and sometimes two trips a day, 25 miles to New York. He makes the round trip of 50 miles in 4 hours, as against 14 hours with horses. He is especially enthusiastic over the work of the truck in the hot summer weather, when the working capacity of his horses is greatly lessened. At such times he works the truck 16 to 24 hours a day, 6 days in the week.

J. A. Suydam, Jr., of Huntington, L. I., uses his four-ton Mack for hauling fertilizer and all sorts of things necessary on the farm. In a single morning he will empty an entire car.

Mr. John Rhoades, of New Hyde Park, L. I., says: "The time is coming when the farmer will be forced to use the motor truck and the demand will be great. My truck, for instance, replaces two teams of horses, and saves me much time and labor."

Louis Werner, a livestock and poultry dealer, of New York, on East 103d Street, says, with his Autocar, which he has now had in service for six months, he goes up as far as Yonkers or over into Jersey and places where he couldn't take orders before. To use his words, "I couldn't send horses, they'd never get back."

The Shoemaker Express
A Rowe truck which averages fifty miles per day. It has displaced six horses

"Baby First, Twentieth Century Limited"
This shows the Towar Creamery Company's Federal, which makes a thirty-mile trip each night, with certified milk for the babies of Detroit

Cost of Shipping Peaches by Motor *vs.* Rail

Comparison of the cost of shipping peaches by rail and by motor is offered by data given out by some fruit growers of Glassboro, N. J. One shipper who has a small orchard, and is therefore shipping in small quantities, and has to pay a high express rate, found that handling peaches in this way in the ordinary basket, netted him only $.05, out of which he had to pay for the picking, packing and incidentals. In the same neighborhood another grower uses a truck and delivers to Atlantic City. He carries about 250 baskets per load, as the baskets are on tiers on board platforms, so that they do not rest on or jostle each other. The fruit arrives in excellent condition, and the cost of the trip to Atlantic City averages about $.02 a basket when full loads are carried. These peaches are sold on the same market as those of the other grower, but owing to the difference of their arrival, condition and difference in hauling cost, net the grower $.25 instead of $.05 per basket, a difference of $.20 on each basket, or $50 on a load of 250 baskets.

Motors Revolutionizing Milk Supply

Nowhere has the truck proved more useful than in the dairy business. Milk of all foods must not be overheated or allowed to stand. Motor driven vehicles have revolutionized the business and are destined to change existing conditions even more as their utility for this highly important food supply transportation is more generally realized.

"Baby First"—Three Hours From the Cow to the Baby

The Tower Creamery Company, of Detroit, Mich., uses Federal trucks for special milk hauling for the babies, one truck in particular being dubbed the "Twentieth Century Limited." It makes a run of 30 miles every night, delivering certified milk to the creameries in the record-breaking

GMC Trucks of Various Capacities Hauling Farm Products
The machine in the center illustration averages sixty miles per day, hauling apples to market in Detroit. This machine paid for itself in four months and netted a profit of $1500

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

time of 3 hours after the milk comes from the cows. The following figures show the exact schedule of this nightly run which takes place regardless of weather:

Federal truck in use	3 hours
Running time	2 hours 35 minutes
Standing time	25 minutes
Miles traveled	30 miles
Average speed	11.24 m.p.h.
Weight hauled	2700 lbs.
Number of quarts	560
Cost of hauling	$2.36
Cost per quart of hauling	$0.0042
Cost per 100 lbs. of hauling	$0.087

H. C. Teale, superintendent of the farm, a thoroughly practical and scientific dairyman, says: "It couldn't be done by any other means of transportation, as quickly and as economically as this."

Quick Handling

The milk is brought directly to the bottling plant by the attendants after each cow is milked, and it runs directly over coolers that bring its temperature down to 45 degrees F. It is then bottled and placed in a refrigerator ready for shipment.

Under ordinary shipping conditions, that of electric and steam railroads, this milk would have to remain in the refrigerator at the farm over night; the following day it would go to the retailer and remain in his refrigerator over another night; and would go to the ultimate consumer the following day.

Austin F. Patch, the driver for the North Shore Dairy Company, Boston, Mass., says that he collects milk from 38 dairies over a route of some 40 miles, which takes him into all kinds of places. During the summer afternoons he hauls ice with a run of 12 miles, and finds that the truck is the only means by which such a service could be carried on.

Schear's Dairy Farm Reduces Haulage Cost Over Sixty-Seven Per Cent by Means of Trucks

The Schear Model Dairy Farm is located about 15 miles west of Detroit, in the small town of Redford. The Federal trucks are used for hauling the milk and cream to the city of Detroit, the round trip being some 20 miles. Actual tests were made, using the Service Recorder Company's instruments on the trucks, and also on the horse vehicles. It was found that the average speed of teams was 2.8 miles per hour, while that of the trucks was 10.4 miles per hour, the truck gaining 7.6 miles on a team every hour it was in operation.

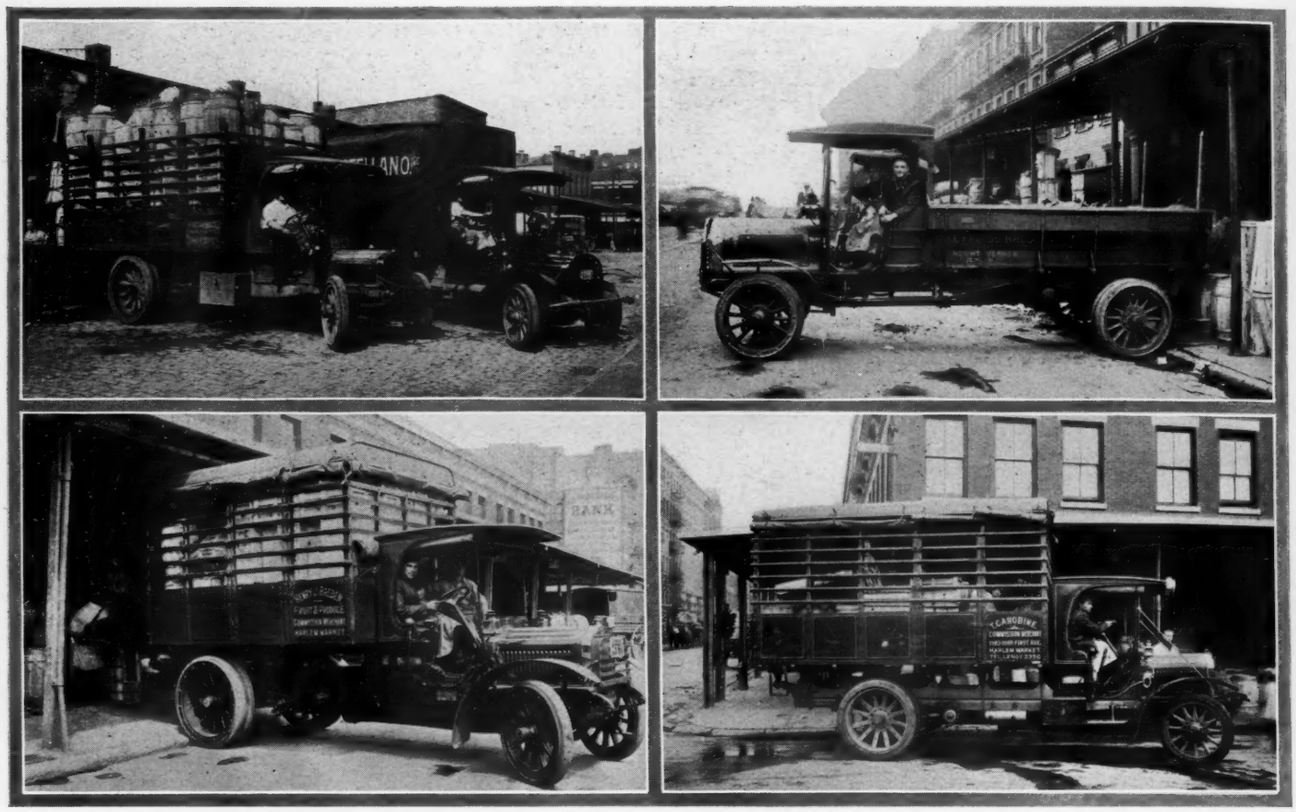
The same quantity of milk was hauled from the farm over the same roads to the same markets. The following time and cost study is the result of this investigation. It shows that the total cost for doing the work with horses is $7.56, as against $2.52 with the truck. The costs were reduced 67 per cent., and also a saving in time was made of over one-half day:

	Motor Truck	Team and Wagon
Total time away from farm	2 hrs. 20 min.	7 hrs. 56 min.
Length of time in motion	1 hr. 54 min.	7 hrs. 2 min.
Length of time standing	26 min.	54 min.
Miles covered round trip	19.8 miles	19.8 miles
Average speed	10.4 m.p.h.	2.82 m.p.h.
Cost in dollars for the trip	$2.52	$7.56
Cost per 10 gal. can	$ .09 per can	$ .27 per can
Cost per 100 pounds	$ .08	$ .24

Does the Work of Twenty Horses

The Minden Butter Manufacturing Company, of Douglas County, Nevada, writes as follows:

"This is the third year that we have been running our Federal truck, and we are hauling cream within a radius of 15 miles. The truck is doing the work that practically 20 horses were engaged in doing before we put the machine on."



Group of Saurer Trucks in Produce Hauling in the Metropolitan District

The types of bodies most suitable are here shown. Attention is also called to the fact that several of these trucks are fitted with very substantially built angle iron and strip steel radiator protectors, which are very essential in the crowded market district

Truck Saves $1100 Over Horses in Fifteen Months

Another dairy farmer now using motor delivery is the Smith Brothers' Jersey Farm. Having disposed of their teams about 15 months ago, they replaced them with a 40-h.p. truck. They average about 30 miles a day, and claim the truck has taken the place of 6 horses and 2 wagons, one man handling the deliveries, where formerly two were required. As an example of the daily routine, with a boy as "hopper," that is to jump off and on the truck and put the milk on the porches, the car covered 30.5 miles in 2 hours and 55 minutes, during which time 75 gals. of milk were delivered, all of which was put up in quart and pint bottles.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

The owners state that the mechanical milker, together with automobile delivery, have revolutionized their dairy business. The following is their estimate of the cost of delivering with automobile as compared with teams:

First truck cost	$1,200.00
Gas for 15 months	250.00
Oil	45.00
Tires	175.00
Repairs	75.00
Making a total of	$1,745.00
Credit allowed on new car	500.00
Total expense for 15 months	$1,245.00

As compared with team delivery:

Three teams, 15 months at $15 per month	$675.00
Extra man, 15 months at $50 per month	750.00
Original cost of horses	450.00
Cost of two wagons and harness	470.00
Making a total of	$2,345.00
Leaving a balance in favor of the truck	$1,100.00

In commenting on this report in a letter to Kimball's Dairy Farmer, the owners' state:

"You will note that I am figuring the cost of team very low. With the truck we can place our milk on the market in less than one-half the time required when using teams, which has almost entirely eliminated complaints. Living as we do, 8 miles from the heart of the business district, we are enabled to place our milk in the homes of our customers within 3 to 15 hours from the time it is milked, thus putting us in a position to secure the highest price for our product.

"With the advent of the automobile, the milking machine and bottling machine, the dairy business has been made a pleasure rather than drudgery, as heretofore."

Fruit Grower's Truck Paid for Itself in Four Months

Fruit growers are beginning to realize the assistance that trucks offer to successful handling and marketing their product. In many instances a systematic analysis of local conditions and an intelligent use of the truck as a delivery medium will bring added profits from an orchard. Such was the experience of Mr. D. Oliver, owner of the Lake View Fruit Farm, at Orchard Lake, Mich.

His best market is Detroit, but that city is 30 miles distant from the orchard, and one trip with a team and load of 40 or 50 bushels of apples was a long day's work. There are one or two markets much nearer the farm, but to deliver his fruit there or sell the orchard outright to commission merchants meant a much smaller margin of profit on the crop.

Last fall, with 6000 bushels of apples to dispose of and the logical market just out of reach, he figured that the only way to boost his profits was to invest a little money, so he bought a motor truck and moved the entire crop to Detroit, where he received from $.25 to $.40 more per bushel than if he had sold them at the farm.

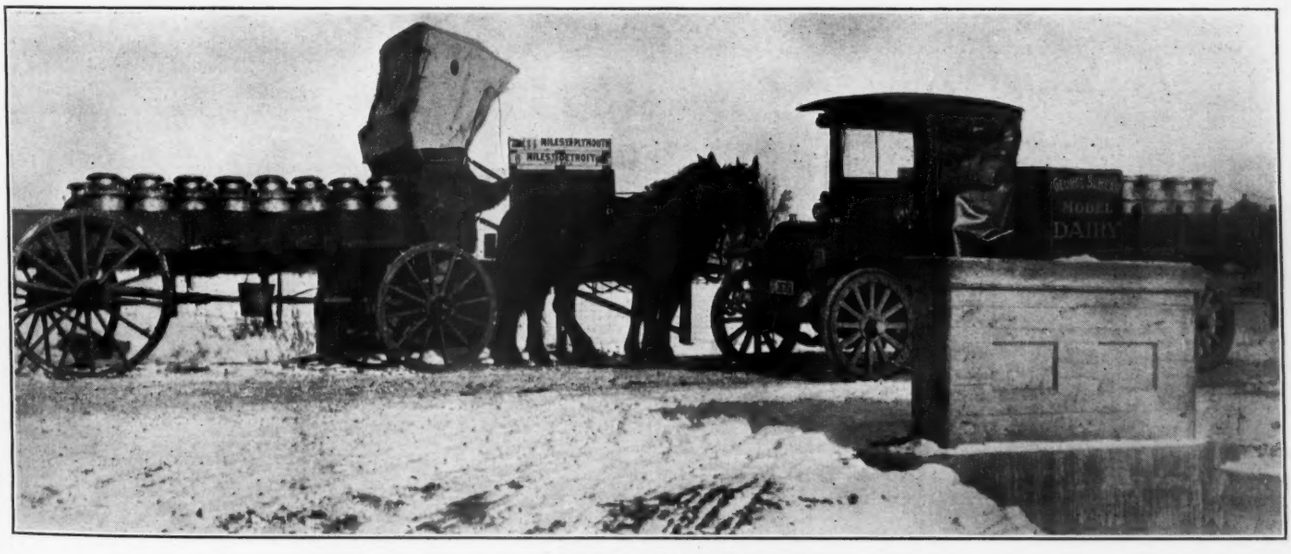
The truck, which is a GMC one and a quarter ton made two round trips per day, 60 bushels to the load. Figuring at $.25, which was the lowest amount of additional profit received per bushel, his truck has made him a net profit of $1500 and paid for itself in the 4 months it has been in service. He has been to no expense whatever for repairs on his truck, and it has never failed to make the 60-mile trips, even in the snow, which has been the heaviest in that section of Michigan in years.

One of the Seven Three-Quarter Ton White Trucks Owned by J. B. Blood, Lynn, Mass.

Similar experiences are frequently heard of from all fruit growing sections of the country, and it begins to seem that the motor truck is taking a most important part in the successful handling of crops. As in the instance of Mr. Oliver, his truck has enabled him not only to get his apples to the right market, but to get them there when the market was best.

The Convertible Car on the Farm

Small convertible cars are also very useful to the farmer. Many of these machines are used in the Far West, hauling the



Circumstantial Evidence

The wagon, still on its way to the city, is met by the truck which has already delivered its milk, and is on the return trip. The truck completed its work at 10.40 in the morning, while the wagon returned at 4.40 in the afternoon.

The CCJ leads in circulation, advertising and prestige

Standard Truck in Produce Service, Los Angeles

Even the progressive Japanese produce merchants of California recognize the money-saving features of the truck for produce delivery. This truck has displaced seven horses and three wagons, leaving the farm at 5 a. m. instead of midnight, as when horses were used.

family to church on Sunday, or for pleasure trips into the mountains and carrying berries and other produce during the week.

Mr. Glenn C. Kelly, of Portland, Ore., delivers blackberries to the individual housewives. He picks the berries early in the morning and delivers them direct to his customers before noon of the same day. Owing to the freshness of the berries when they arrive he has a sure and growing market, and the women are anxious to have his berries, either for the table or when canning. A grower near Corvallis says that he always gets the best prices for his berries on account of his early arrival at the market. Another farmer 30 miles from Dalles made use of his car to great advantage when his harvest machinery broke down. Having telegraphed to the Portland supply house for repairs he met the train at the station and reached his farm with the parts, having covered 30 miles easily in a few hours, so that the harvesting and the extra hands always hired at that time were not held idle. If he had to depend on teams, it would have been a very different story.

The use of the engine for operating cutters, plowers, or even as a tractor is quite common. Manufacturers are now catering to this field, a notable example being the recent announcement of the Ford Motor Company of a tractor for $200, which embodies the well-known power plant of the Ford runabout.

Japs Use Truck in Produce Service in Los Angeles

Even the progressive Japanese produce merchants of California recognize the money saving features of the truck for produce delivery.

Here is an interesting account from Kitada & Taenaka Produce Company, of Los Angeles, Cal., who state that before they got a truck they were using seven horses and three wagons, and in order to get their produce to the market, they were obliged to get up at midnight, in order to reach the market by 6.30 the next morning, traveling all night on Gumbo roads (which are not boulevards), but they now state that their Standard truck is doing all this work more satisfactorilly in one-fourth the time, in other words, they leave their farm at 5 a.m. and can make the trip of 24 miles in an hour and a half, which formerly took them 6 hours with their horses and teams. They claim that the truck paid for itself, within the first 6 months and they have recommended the use of the truck to everyone of their countrymen as a means of making money faster than by any other method, stating that the motor truck is indispensable to a progressive business man.

Use of Commercial Cars by Farmers and Produce Men

By W. D. MENG

FROM pop-pop to four and a half ton electric truck the auto vehicle is gradually proving its usefulness and necessity in the transporting of food products economically. Every month some new service of the auto vehicle in this respect is disclosed, and the various combinations by which the supplying of food by these vehicles is attained are increasingly interesting. Let us hook up a few of these factors in the reduction of the high cost of living.

The two most important factors in the reduction of the cost of living in this century are the interurban railroad and the truck or automobile adapted to rural travel. These have made the farming conditions so much pleasanter and less arduous, that the development of the farms themselves has been stimulated, and the threatened exodus to the cities has been checked. The interurbans have in many sections gone rather extensively into the handling of produce from the truck gardens and farms along their lines, into the city centers; dairy products have been most quickly responsive to this service. In Kansas City, with five interurbans, there has been comparatively slow growth of the produce hauling, chiefly because of the lack of freight terminal facilities. The Leavenworth line hauls produce to Kansas City, Kan., but not to Kansas City, Mo. The only lines doing much hauling in express cars are the Strang, from Olathe, Kan., and the St. Joseph and Excelsior Springs, from the Missouri side of the city. Both of these lines have express terminals, in the north end near the city market and one of the wholesale grocery districts. It is notable that many farmers bring their produce to these interurban express cars in automobiles; and as the illustration shows, the consignees of the produce usually get the goods off the cars into auto trucks. The picture shows a truck of the Aaron Produce Commission Company loading from a Strang line express car. The other companion phase of the interurban-automobile co-operation is illustrated in the picture of the "jitney" that carries passengers and small produce packages accompanied by owners, from rural towns

Produce Commission Company's Truck

Loading from interurban express car

The CCJ has most advertisers because it gives them biggest returns

to interurban or street car terminals or connections. The development of this business has been rapid in the West. One 'bus and truck combined is now running to a St. Joseph line connection, serving about 8 miles from an "inland" town that is the center of a prosperous community. Two Studebaker combination 'buses and trucks are now serving a St. Joseph rural community, and others are prospective. There are at least seven projects on foot now for similar service along the various interurbans entering Kansas City. The chief utility of this service is for the comparatively small grower, and for the larger grower on days when he does not wish to take the long trip to town with his own machine. The development really opens a market for thousands in the Missouri Valley and the valley of the Kaw, within a distance of 8 to 15 miles of interurbans, on routes from small villages to interurban stations where express jitneys can count on regular business.

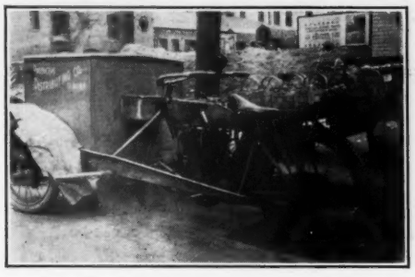
Truck Gardening

The opportunities for truck gardening that are opened by the availability of trucks that can make rapid deliveries and quick trips, are really wonderful for the man of moderate means. A striking example of the taking advantage of these opportunities is found in W. F. Mannschreck, a meat dealer and grocer of St. Joseph, Mo. Mr. Mannschreck has recently bought a small tract of low-priced land 8 miles from St. Joseph; about 10 acres. The land is low priced for truck gardening purposes, but of that fine quality which has made the district famous for the production of seed. It suddenly became equal to suburban garden tracts, to Mr. Mannschreck, by the purchase of a small truck. He can go out to the farm in the morning, if necessary, and return with a load in time for the early market. He brings much stuff to his own store—and he can get it quick even during the day, if necessary—he is not dependent upon the wholesale market of the city. The car is also used in local service from his store. Mr. Mannschreck's son, 14 years old, is learning to drive the car, and he probably will have general charge of the farm and delivery, being in close touch with his father by telephone.

A more highly developed combination of local merchandizing and production is that of the Dreyer family in Kansas City. F. W. Dreyer, the father, has a farm 8 miles from Kansas City, at Turner, Kan. A. F. Dreyer, a son, is in the produce commission business at Kansas City. Another son, M. G. Dreyer, drives a Koehler truck, carrying 2000 lbs. to 3000 lbs., loaded with produce, from the farm to the city market station of A. F. The truck leaves the farm every day at 4 a.m. in the summer, later in the winter. It makes the 4 miles in three-quarters of an hour. The boys used to get up at midnight or earlier, in the days of horse hauling; and if the truck had been needed in town during the day, that left very little time for sleep. Not only is the actual time of making the trip cut from 2 hours to less than 1, but the time of preparing in the morning, and getting the transportation equipment out of the way at night, is lessened. And the truck is good for an all-day job in town if necessary, carrying goods from the commission house to the grocer-customers. And it can take as big a load of freight back to the farm, as it had brought in. The cost of operation is somewhat below horse-operation—but the Dreyers ostensibly figure the cost above that of maintaining horses, because there is such a saving in time, and such an increase in efficiency.

Used for Hauling Produce

W. L. Pattison is another Kansas City district grower who has discarded horses for delivery of produce to the city market. He has two cars, a Reo and a Gleason—



Producers Distributing Company's Motorcycle

Kansas City pioneer in bringing producer and consumer closer together

and all to serve 3½ acres of greenhouses and garden! His is probably as extended a refinement of auto truck usage as is available. His men make two trips a day with produce, plants, etc., when necessary. One truck is used, the other being held in reserve. Mr. Pattison has sold all his horses; he hires his plowing done. "I save all my time of going and coming," Mr. Pattison said; "It used to take 3 hours to cover each way—now less than an hour, which seems to be no time at all compared with the former period of travel. The men have more energy and life, and are happier, with the trucks, and without the tribulations of taking care of horses." The trucks often earn their weekly costs by hauling freight to the farmers of the neighborhood.

A quite remarkable development of auto truck usuage in connection with farming is that of A. M. Sourdry, 13 miles from Kansas City, 4 miles beyond Independence, Mo. He has 21 acres, which he has farmed for several years. But his prosperity as a farmer dates from the time that he bought his big Reo. He hauls around 2 tons, depending upon the character of the produce brought in. Formerly his market was limited because of his inability to make quick trips, and he had to rely upon one marketing a day. Now he can make two or three trips a day if necessary—but he has developed a better plan than that. Mr. Sourdry had already worked up a trade with local stores in Kansas City, running three teams for delivery to these stores. But the three teams did not all work the same day—it was toilsome work for the horses, and they could not stand the gaff. He had to buy new horses frequently, too. Now he starts at 3 o'clock in the morning, against before midnight with teams; makes the trip in an hour and a half, disposes of his wholesale stock at the city market, and tours the city to his circle of stores. He visits some seventy of these stores, cutting off one middleman's profit. Because of the large size of his truck, he is able to bring immense quantities of seasonable vegetables when the prices are right, and he has made several "cleanings" in the past 2 years through that opportunity. Where he could carry 100 baskets of tomatoes at $1.25 a basket on a wagon—he used only one wagon a day in the old times—he can carry 240 baskets on the truck. Tomatoes fluctuate radically and he has records to show that he has made a positive profit of $100 on many different days because of the capacity of his truck. The truck uses $.60 worth of gasoline a day. Mr. Sourdry has spent $6 for repairs the past year. The teams used to wear out in about a year—Mr. Sourdry regularly bought one new team every 12 months at $250, selling the old one that it replaced at half price. He estimates that the truck has brought a clear gain in net income to him of $1000 a year. It has also made his land worth three or four times what it was before—it is in a farming district, where taxes are low; he has built a fine residence, and is near school for the children that are soon to be approaching the age to be educated. The case is one of the romances of life for which the auto truck for farm use has been responsible.

Letts Parker Electric Truck

Saved more than $400 a month on city deliveries of food products in St. Joseph, Mo.

City Use of Trucks

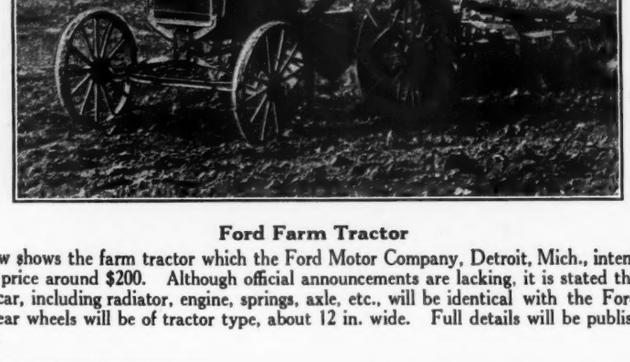
Reverting to the city use of trucks for hauling produce, the case of the Letts Parker Grocery Company, of St. Joseph, is notable. Herein both service and economy are conspicuous contributors to the reduction of the high cost of living. The company formerly used in its local deliveries, in a radius of 4½ miles of the warehouse, five teams each with a driver, the total cost of which was $625 a month. The company bought a GMC four and a half ton electric—and the saving is almost unbelievable. The company maintained four salesmen in the city, including South St. Joseph, who visited each 200 customers a week, covering the territory twice a week. This made at least 800 customers, whose orders were coming in almost daily, as a result of the visits of salesmen, and of telephone calls on forgotten items. The men made their trips in automobiles. This immense trade is now served, in the delivery of goods, by the one GMC truck—and the company is adding salesmen to give the truck enough to keep it good and busy! The truck is kept at the garage of the Selden-Maxwell Auto Company, which last fall installed a charging station in its new and completely equipped quarters. The cost of current and garage service on the truck is $60 a month; a driver costs $60 a month; a freight handler on the truck, $50 a month. Add $10 for incidentals, and the truck serves these 800 customers, in a radius of 4½ miles, prompt service, for $180 a month. Against $625 a month for the teams, $180 a month for the truck looks good! The Letts Parker Grocery Company is said to be satisfied with the truck.

From Producer to Consumer

One phase of the movement of produce from producer to consumer is proving mighty significant in Kansas City, and it is being developed by a motorcycle. The Producers' Distributing Company was organized a year ago to handle goods on percentage between the farmer and the citizen. At present most of the consignments come by interurban or by parcel post or freight; deliveries are made by parcel post, taken to the post office by motorcycle, and by motorcycle in the city. A truck on the motorcycle can handle baskets of potatoes and other such vegetables, and is rapidly showing the people the advantage of the close connection which the company provides between the producer and the ultimate purchaser. Eventually, auto trucks will be put on for local delivery, and plans are being made for accommodations, such as docks and garage, for auto trucks of farmers who bring their produce to the headquarters. A substation is being planned in the edge of town, where farmers in the neighborhood of Kansas City may bring their goods, to be handled within the city by the company, either taken to the main office downtown, or distributed from substation to consumers.

To recapitulate, one discovers that as a matter of fact the use of auto trucks in bringing the producer and consumer closer together, increasing the ease and profits of business while at the same time providing fresher goods, prompter delivery, and steadier prices on a lower level to the citizen, is only beginning. The motorcycle for small parcels, which will soon be replaced by the auto truck in local delivery, is pioneering for the Producers' Distributing Company, where the company is only the commissioned agent of the farmer in dealing with the housewife. The commission man with connections with a truck gardener, both owning the truck which can be used for hauling produce in, and then delivering it to grocers, is cutting down an important item of expense. The truck grower himself, with his auto truck, is able to buy and own cheaper and better land, while having perfect facilities for getting to market—and for putting his own produce directly into the hands of the ultimate consumer. The commission merchant and the grocery company find the big electric the ideal economic means of distributing the city's food from wholesale warehouse to the retail stores. And the "rural jitney" is now linking the distant farms, perhaps on roads that are not paved, distant from the macadam highways into the city, linking these farms with the interurban stations from which the electric cars can take the produce into the market. A wonderful situation already developed—which must within few years, perhaps within months—bring changes that will seem to have required generations.

For additional articles on the use of trucks in farm and produce business see page 33.



Ford Farm Tractor

This view shows the farm tractor which the Ford Motor Company, Detroit, Mich., intends to manufacture at a price around $200. Although official announcements are lacking, it is stated that the front part of the car, including radiator, engine, springs, axle, etc., will be identical with the Ford passenger car. The rear wheels will be of tractor type, about 12 in. wide. Full details will be published as soon as available.

White Good-Roads Truck Owned by Louis Martine, LaPorte, Indiana, Building Road at Total Cost of 13½ Cents Per Yard

At the left: Eliminating the roller by hauling over the stone that has already been laid. Note the uniform smoothness of the compacted stone. At the right: Unloading the trailers after the truck has dumped and spread its load. The trailers merely dump and are pulled away.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

The Atterbury New Three-Ton Worm-Driven Truck D-W

By GEORGE W. CRUPP

THE Atterbury Motor Car Company, Buffalo, N. Y., has just placed on the market a three-ton worm-driven truck known as Model D-W. In the past the Atterbury people confined themselves to the making of chain-driven trucks.

The new model contains a number of important improvements over the former trucks. There are less working parts; more mileage may be obtained from gasoline and oil; more tire mileage. It has a newer and larger radiator; it is worm driven, and has heavier buffer springs on the radius rods.

The new Atterbury chassis is stronger, simpler and more economical than previous models. All parts are easily accessible in order to avoid delay in making repairs.

Engine

The engine used is made by the Continental Motor Manufacturing Company. It is located under a hood in front of the driver's seat. It is of the vertical four-cylinder four-cycle type, cast in pairs, rated at 38 h.p. at 1200 r.p.m., 50 h.p. at 1500 r.p.m. The bore is 4½ in., and the stroke is 5½ in.

The Bosch duplex system of ignition is used. The best rubber insulated high-tension wire, with brass terminals at end, well soldered, is used. The Bosch lock switch is placed on the dash. Spark plugs of the S. A. E. type are used.

Each engine is equipped with a Stromberg Model G.

Transmission

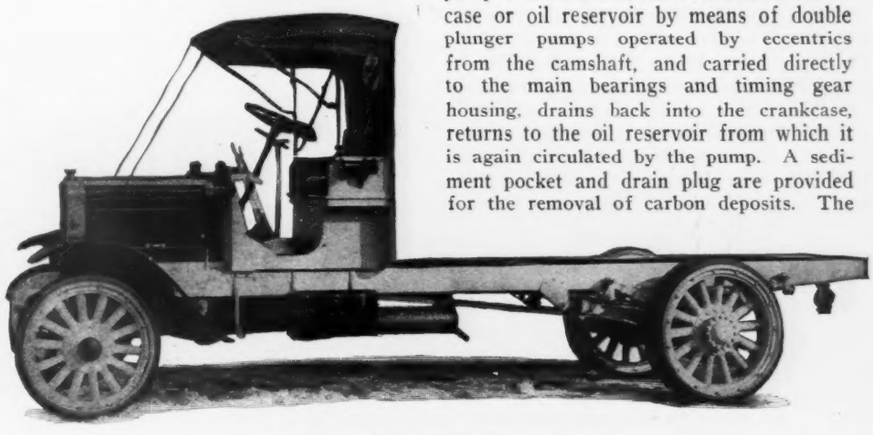
The transmission is of the Brown-Lipe selective sliding gear type, with three speeds forward and one reverse.

The power is transmitted to the rear wheels through a nickel-steel propeller tube provided with a full set of universal joints. The ratio of the worm gear is 10.33: 1. The driven gear is made of bronze, while the worm drive is made of alloy steel.

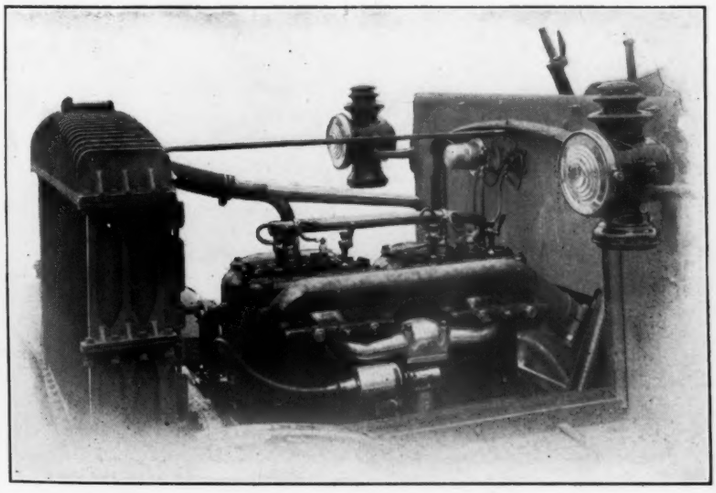
The clutch is of the dry plate, Brown-Lipe multiple disc type, made of twelve crucible steel plates which are positive, but very flexible in operation. All discs are faced and lined with Raybestos. The clutch may be lubricated with a standard grade of oil, or it may be operated dry. The clutch is enclosed in a neat dirt-proof housing.

Lubrication

A combination force feed and gravity system of lubrication is used, oil being pumped from the lower half of the crankcase or oil reservoir by means of double plunger pumps operated by eccentrics from the camshaft, and carried directly to the main bearings and timing gear housing, drains back into the crankcase, returns to the oil reservoir from which it is again circulated by the pump. A sediment pocket and drain plug are provided for the removal of carbon deposits. The oil is screened each time it passes through the engine. The oil capacity is 8 qts.



Atterbury Three-Ton Worm Drive
Side view of the truck with body removed, showing large frame, heavy wheels, etc.



View of the Atterbury Power Plant
Note the massive radiator. Engine is a four-cylinder Continental

Rear Axles

The rear axle is a worm-drive full floating type made from a continuous piece of special 3½ per cent. nickel steel to which the springs are attached by special designed spring seats giving maximum strength and neatness of appearance. The worm and worm gear which are made by David Brown Company, of England, are mounted on Timken roller bearings.

The brakes are of the internal expanding duplex type which operate against an 18-in. diameter brake drum. All brakes are 3½ in. wide. The service brake is operated by a pedal and the emergency by a hand lever.

An irreversible worm and nut type of steering gear with large bearings and wearing surfaces is used. The steering wheel is a cast steel spider with a rim 22 in. in diameter. It is a left drive and center control.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

Strut or Radius Rod

The Atterbury Model D-W has a heavier strut or radius rod which is made to swivel on the rear axle with a double universal action, so as to relieve any undue strain to the axle when the wheels get into depressions. Very heavy buffer springs on the front end of the radius rods take up the shock when starting suddenly. This relieves all mechanism from sudden jars and increases the life of the machine.

Frame

Carefully selected channel section cold rolled nickel steel which is heat treated is used. The side rails are straight from front to rear. The side members are 7 in. deep, 3¼ in. wide and ¼ in. thick.

The Overall width of the frame is 38 in. front and rear. The length of the frame back of the seat is 174⅜ and 144⅜ in. respectively. The length of the frame is made in two dimensions. Rear axle to rear end of frame is 65 in. and 55 in. respectively. Length of frame from back of seat to rear axle is 109⅜ in. and 89⅜ in. respectively. The height of frame over the axle when empty is 37⅜ in. and when loaded 34⅞ in.

Springs

All front springs are 3x38 in. built up with eleven leaves. The rear springs are 3x54 in., built up with twelve leaves and banded. Both front and rear springs are triple tested, semi-elliptic with phosphor-bronze bushing in the eyes. The leaves when assembled are coated with a compound of graphite and grease. All springs are made of the best grade oil-tempered chrome-silicon-manganese spring steel. Three-quarter bolts are used.

A new type of radiator is being used which has a higher cooling efficiency. It is a cast aluminum special vertical tube type, equipped with a centrifugal pump and an 18-in. fan, belt driven, mounted on ball bearings. The jacket is heavily constructed. There are generous openings for water circulation. The radiator is mounted on special trunnions and springs so as to eliminate all damage which may occur through jars and vibration.

Wheels

The wheels are of the artillery type and made of the best grade of second growth hickory. The front wheel is 36 in. in diameter and has twelve spokes 2½ in. in diameter while the rear wheel is 40 in. in diameter and has fourteen spokes 3 in. in diameter. The front tires are 36x5 single (solid) and the rear tires are 40x5 dual (solid). The wheelbase is 188 in. and 168 in. respectively, and the tread is 65 in.

Body

The standard body length is 144 in. minimum and 198 in. maximum in clear. The width, standard dimensions are 48 in. minimum and 72 in. maximum in clear. The height of the body (express) is 72 in. Height of platform from the ground is 48⅜ in. empty and 45⅞ in. loaded.

This truck has a carrying capacity of 3 tons. A gasoline capacity of 22 gal. The chassis weighs 5670 lbs. and sells for $3600 f.o.b. Buffalo, N. Y.

Service Brings Out Two New Worm-Drive Models

THE Service Motor Truck Company, Wabash, Ind., has announced two additions to its line of commercial cars, Model PW, two tons capacity, and Model W, one ton capacity. In general these two models resemble each other, except as to size and strength of parts and components.

Engine, Transmission and Clutch

The engines are of Buda make, four-cylinder, with enclosed valves. Model W has a 35 h.p. model, while Model PW has a 40 h.p., with bore of 4⅛ in. and stroke of 5½ in. Eisemann magneto is used for ignition, Stromberg carburetor, with hot air tube and auxiliary nozzle. Radiator is of heavy truck type with spring suspension. Gasoline tank is of seamless pressed steel with a capacity of twenty-one gallons.

Transmission is of Brown-Lipe manufacture, selective sliding type, three speeds forward and one reverse. All gears are chrome vanadium steel, mounted on nickel steel shaft and Timken bearings. Center control.

Clutch is of cone type, leather-faced.

Axles, Brakes and Wheels

Front axle is drop-forged, I-beam section, with Timken bearings.

Rear axle is Timken-David Brown worm drive, with spring pads integral with housing; Timken bearings.

Brakes operate on rear wheels, service set being contracting and emergency, expanding. Equalizers are fitted to both sets.

Wheels are of artillery type, fourteen spokes per wheel, tires 36x3½ in. front, 36x5 in. rear on Model W and 36x4 in. front, 36x4 in. dual rear on Model PW.

Other Details

Frames are of pressed steel, heat-treated with five cross-members. Length back of driver's seat is optional. Standard wheelbase is 140 in. on Model W and 160 in. on Model PW. Shorter wheelbases are optional

Engine is under hood, mounted on subframe. Transmission is located centrally between engine and worm-drive rear axle. Hartford universal joints between engine and transmission; Spicer type universal joints between transmission and worm-drive axle. All spring eyes bushed with bronze, all spring bolts hardened and ground with grease cup integral. Spring clips on rear, ¾-in. diameter, made from nickel steel; spring clips, front, ⅝-in. diameter, made from nickel steel. All grease cups accessible from the outside of the truck. All principal bearings adjustable for wear.

Chassis prices are $2000 for model W, and $2500 for Model PW.

Service Model W, One-Ton Worm-Drive Truck

Price of chassis, $2000; body as shown, $2230; length, 10 ft.; width, 47 in. Note length of runningboard

Service Model PW, Two-Ton Worm-Drive Truck

Chassis, $2500; body as shown, $2925, complete with driver's cab. Body is interchangeable with stakes; seats upholstered and car painted but not lettered

The CCJ leads in circulation, advertising and prestige

The Garford New One and a Half Ton Worm-Drive Truck

THE Garford Motor Truck Company, of Lima, Ohio, recently announced a new one and a half ton worm-drive truck, which differs radically in many respects from the heavy-duty trucks of the same make. In this model, the engine is placed under the hood, instead of under the cab, as in former models, the curved steel dash with its inset lights being still retained as characteristic of Garford construction.

Among the most interesting features are the full-floating rear axle, which embodies the latest practice in worm drive; a superior drive system with four strong universal joints, and an improved oiling system, which combines both splash and force feed. The regular chassis is furnished with right-side drive, but left-side drive is optional. The pressed-steel, hot-riveted frame has a channel section of ample dimensions, reinforced with cross members and gusset plates. Ample space back of the driver's seat is provided for bodies of all capacities and designs, suited for loads within the carrying capacity of the truck. The complete chassis, with full equipment, driver's seat with cushions, one seat having its back hinged to facilitate entrance to body, retails at $1800.

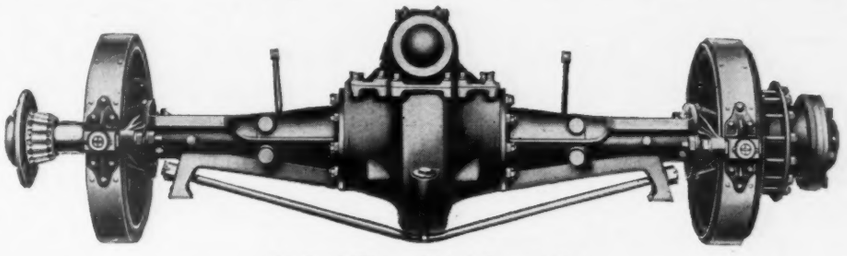
The engine is flexible and powerful, with a surplus of power over anything that will be required to haul a full load. With four en-bloc cylinders, 3¾ by 5½ in., it is rated at 35 h.p. The valves are fully enclosed on the right side of the engine, all gas passages being inside of the main cylinder casting. Large water spaces and a centrifugal water pump insure efficient cooling. The crankcase is an aluminum casting of good proportion. The oil base and gear case are also of aluminum.

A feature worth special notice is that except for the fan and the magneto drive, no moving parts are exposed. The flywheel is enclosed in the crankcase, which is attached to the clutch housing, which in turn encloses the multiple dry-disc clutch.

Ignition is by high-tension magneto. The wiring is of the simplest design, only one low-tension and four high-tension wires being used. The carburetor is of the Rayfield automatic float-feed type, hot water jacketed. A combined splash and force-feed oiling system assures efficient lubrication under all conditions of service.

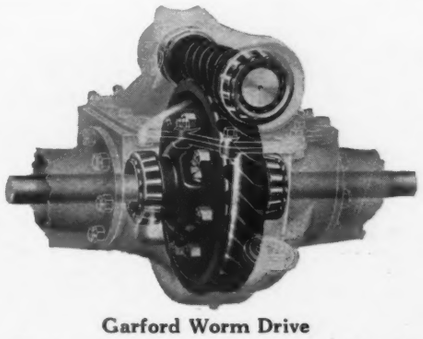
As previously mentioned, the clutch is enclosed in a housing which surrounds the flywheel. The working parts consist of a series of steel plates faced with a non-burnable material especially adapted to this purpose. The plates are arranged alternately, one set being driven by the flywheel and the other connected to the clutch shaft.

The transmission, three speeds forward and reverse, is a selective sliding-gear unit mounted amidships and supported at three points from two cross members of the frame.



Garford Worm-Drive Rear Axle

This is of the full-floating type, the worm being on top. Note the truss suspension underneath the housing, which gives additional strength



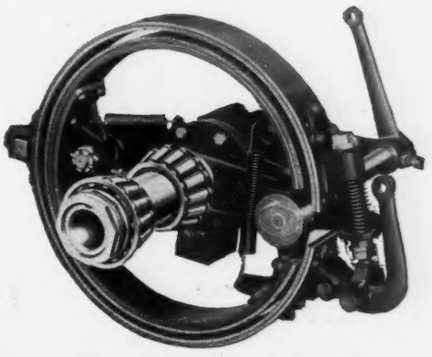
Garford Worm Drive

Phantom view, showing arrangement of units, and mounting on taper roller bearings

The drive system, which includes four universal joints of superior construction, eliminates entirely any possibility of twisting or breaking the shaft, due to road shocks or rough usage. The length of drive-shaft between the clutch and rear axle is evenly divided.

The truck is provided with an unusually large braking area. Left-side drive and center gear shift make driving exceedingly simple.

Timken roller bearings are used in the front wheels, which carry 36x3¼ in. demountable tires. The rear wheels are larger with tires 36x5 in.



Garford Brake Construction

Showing external and internal bands and taper roller bearings on which wheels are mounted

The equipment includes two oil side-lights mounted in the curved dash front without brackets, accessible for lighting and filling from inside the driver's cab. This arrangement prevents rattling, and the location is such that the lamps cannot be broken or damaged in any way. A rear signal is also provided. Other equipment includes odometer, driver's seat with cushions, and separate folding backs, jack, tools, vibrator horn and oil can. Westinghouse self-starter and lights will be provided as special equipment.

The New Garford, a One and a Half Ton Worm Drive; Chassis, $1800

Principal features are worm-drive rear axle, four universal joints, splash and force-feed lubrication, etc. The body here shown is a slat-side stake

The CCJ has most advertisers because it gives them biggest returns

A New Truck From Chicago—the Continental

Worm and Chain Drives From Three-Quarters to Three and a Half Tons Capacity Using Standardized Parts

THE Continental Motor Truck Company, 343 South Dearborn Street, Chicago, Ill., recently incorporated by a group of Chicago business men, has placed on the market a series of four models of Timken-David Brown worm drive trucks, the capacities of which are one, one and a half, two, and three and a half tons.

The design and construction of these four models are of the same uniformity and mechanical similarity, there being only a variation of the weight and proportion in each model.

One-Ton Model, CF-1 Engine

Type "C" Continental engine, manufactured by the Continental Motor Manufacturing Company, of Detroit, having a 3¾-in. bore and 5¼-in. stroke, is used in the one-ton model.

Transmission

Transmission is a sliding gear set, giving three speeds forward and one reverse, with direct drive on high speed. Gears and shafts are of nickel steel, heat treated. Gears are 6-8 pitch. This unit is mounted throughout on annular ball bearings with exception of reverse idler and stub of main shaft, the reverse idler having a bronze bushing and the front end of the main shaft being mounted in a Standard straight roller bearing. Positive interlocks are provided and it is impossible to get two locks into mesh at same time. The transmission is mounted in unit with the engine, the clutch being carried in a separate compartment formed by transmission case bell and motor flywheel housing.

Lubrication

The engine is lubricated by a force-feed, constant-level splash system. There are two pumps employed which are driven by the eccentrics from the camshaft. Oil is pumped through copper tubes to a point over the timing gears and over the rear main bearings, then drains back into the crankcase, maintaining a proper level for the splash lubrication of the pistons, connecting rod and crankshaft bushing. Provision is made for proper draining of oil and removing the strainer for cleaning.

Axles

Front axle is of Timken make, I-beam section, 2x2¾ in. Rear axle is the Timken-David Brown worm drive, full floating.

Steering Wheel

A Gemmer worm and gear truck type steering gear, fitted with ball thrust bearings, is used. The hand wheel is 18 in. in diameter. The steering gear is on the left side.

Springs both front and rear are half elliptic. They are manufactured by the Detroit Steel Products Company, are self-lubricating and guaranteed for two years against settling, cracking or breaking. The front springs are 2¼x44 in.; rear springs are 3x56 in. Oil cups are all shackle bolts. Rear spring shackle bolts are 1 in. in diameter.

Radiator

Radiator is of the vertical, tubular cast tank type fitted with fins. It is very rigid in construction and easily withstands vibration and sudden road blows. Radiator is supported in such a manner that sudden twisting of frame will not cause it to leak.

Continental Motor Truck

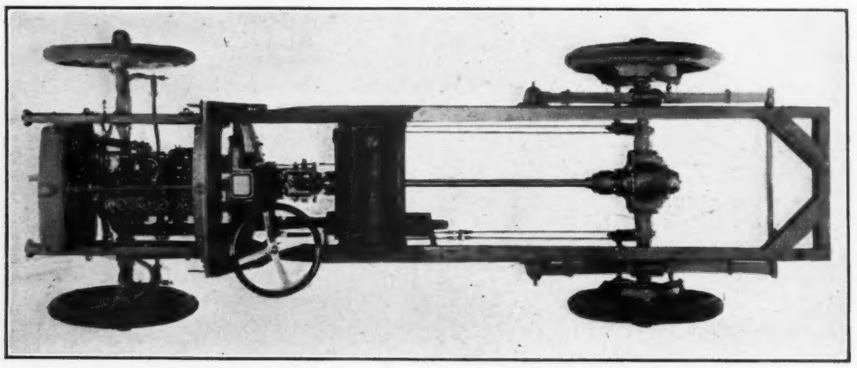
Front quarter view of chassis showing ribbed tank on radiator and details of forward mechanism

Control

Gas is controlled by accelerator pedal in the floor, the clutch and service brake are operated by separate pedals. Right side drive is furnished if desired. There are two sets of brakes on rear wheels. Both 15x2½ in., all interior expanding.

Frame and Springs

The frame is pressed steel, 3-16-in. stock, 4 9-16-in. channel with 1¾-in. to 3¾-in. flanged—gusset top and bottom.



Continental Motor Truck

Top view of stripped chassis. Note that frame is inswept forward to allow of shorter turning radius

Wheels and Tires

Front wheels are 34 in. in diameter and have twelve 1¾-in. square spokes. Rear wheels are 36 in. in diameter and have twelve 2-in. rectangular spokes. These front and rear wheels are made from high-grade second-growth hickory. Front wheels are fitted with 34x3-in. demountable tires, S.A.E. standards. Rear wheels are fitted with 36x4-in. demountable tires, S.A.E. standards. The pressed-on type of tires may be fitted to both the front and rear wheels.

Other Details

The short wheelbase of the one-ton Continental is 120 in.; long wheelbase 144 in. Front wheels have a 56-in. tread; rear wheels 58-in. tread. The short chassis, including tires and driver's seat, weighs approximately 3250 lbs.; long chassis about 3400 lbs.

Starters are not standard equipment, but a combination Gray & Davis starting and lighting system is provided at an additional cost.

Standard equipment consists of all the necessary side and tail oil lamps, horn,

The CCJ has most readers because it gives most information

complete set of tools. Price, including driver's seat and priming coat, f.o.b. Detroit, Mich., is $1500.

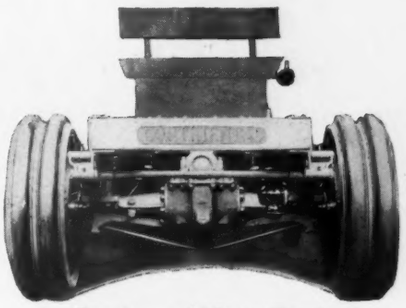
One and a Half Ton Model, CH-1½

The chassis details of this model are similar to the one-ton model with the following exceptions:

Brakes are 17x2¾ in.; frame 7-32 in.; tires 34x3½ in. front, 36x5 in. rear; weight 3600 lbs. for short wheelbase, 3700 lbs. for long wheelbase. Price of chassis, $1700 for short wheelbase and $1750 for long wheelbase.

Two-Ton Model, CJ-2

The Continental engine on this model has a bore of 4⅛ in. and stroke of 5¼ in. rated at 27.23 h.p. by S.A.E. formula. The radiator is of honeycomb type. Tires are 36x4 in. single in front and 36x4 in. dual in rear. Wheelbase is 146 in. and weight 3900 lbs. Chassis price $2100. In most other respects this model is similar to the previously mentioned models.



Continental Motor Truck

Rear view showing the Timken-David Brown worm-drive axle, springs outside frame and truss rod under axle housing.

Three and a Half Ton Model, CM-3½

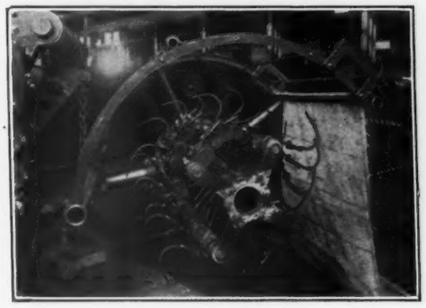
The engine on model C M 3½ has a bore of 4½ in. and stroke of 5½ in., developing 32.4 h.p. by S.A.E. rating. Tires are 36x5 in. single in front and 36x5 in. dual in rear. Wheelbase on short chassis is 14 ft. and on long chassis 17 ft. Price, $3000. Other specifications, excepting as regards size, are quite similar to the other models.

A ROTARY TILLER WHICH IS CLAIMED TO BE SUPERIOR TO THE PLOW

For ages there have been no changes in the operations necessary to produce a proper seed bed, and the essentials of plowing and harrowing are the same as in the days of Pharaoh. And when these operations are best performed there is still much that remains to be done by the uncertain assistance of natural forces to disintegrate the soil and bring about the fine granular condition so much desired for a good seed bed. Inventors and designers have attempted for a long time to construct a machine by means of which a seed bed might be properly prepared in one operation. Only recently have these attempts been successful in Europe, and the Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has undertaken to introduce and manufacture in this country the rotary tiller designed and patented by K. V. von Meyenburg.

The process of tilling or milling the soil by the rotary tiller differs in every respect from the process of plowing. The plow cuts, lifts, breaks and turns the soil. The rotary tiller or soil miller makes chips like a hoe and breaks them up by throwing them against one another. The plow has to be followed by a series of other tools to make a seed bed, but the rotary tiller produces in one operation to the full depth and the full width the desired tilth, even on heavy soils. The machine consists of the tractor on which is mounted the motor and transmission and of the rotor or tiller proper, which carries the tools or claws for cutting up the soil.

The tractor has one steering wheel in front and two driving wheels in the rear



The Rotary Tiller

Close view showing the claws, which dig up the soil and throw it against the rack

of 52 in. diameter by 11 in. width. The drivers have a cast steel rim with horizontal triangular projections on both sides of a flat rim. On the road the machine will run on the flat portion only. The projections will come into action more and more the softer the soil. The weight of the machine with tiller is approximately 4500 lbs. The wheels of the tractor are 6 ft. 10 in. center to center. The whole machine with tiller is 14 ft. over all, so that very little space is required for turning.

The engine is a four-cylinder, four-cycle vertical motor, giving 30 h.p., built for tractor service and is provided with a governor. It is watercooled and a large radiator is mounted in front of it.

A multiple-disk clutch connects the engine and the gear transmission.

Operation

To operate the tiller, a separate shaft is driven by spur gearing from the first gear back of the clutch. This shaft can be thrown in and out of action by a jaw clutch. Where it leaves the gear casing, another shaft is driven from it through a universal coupling. This in turn drives the tiller by means of bevel gear and pinion. A casing surrounds the gears. On the shaft, which is driven by the bevel gear and which extends from both sides of the casing, the tiller tools are mounted. The gearing for lifting and lowering the tiller is also enclosed in the main gear casing. It is designed so that the operator simply has to move a hand lever in the same direction for either lifting or lowering. Part of the weight of the tiller is taken up by an adjustable spring.

To fix the depth of tilling a small shoe is hung from the gear casing enclosing the bevel gear drive of the tiller. The greatest depth to which the present machine can till is 12 in.

The speeds at which the machine can operate are approximately .8, 1.33 and 2 m.p.h. for tilling and 3.6 m.p.h. for traction, the tiller being 5 ft. wide, four to ten acres can be tilled in ten hours.

Only one man is needed for operating the machine. He is placed above the front wheel. All levers and pedals are within easy reach. The tiller may be easily disconnected from the tractor, and the tractor used for other purposes.

The claws are made of hardened steel, and as they are the parts subjected to greatest wear, they are made separate from the holders so as to be easily replaceable when worn out. The claw holders are made of best spring steel. They are mounted on the tiller spider or drum and can also be replaced individually when broken by accident.

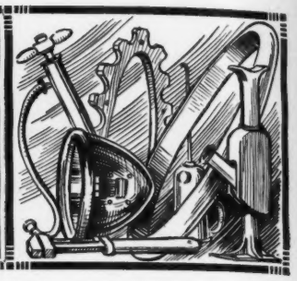
The rotor runs at constant speed. Its circumferential velocity is much greater than the forward motion of the machine. The tractor serves merely as a pacemaker determining the amount of forward motion.

The Rotary Tiller

Showing the tiller at work in a field, with rotary claws in motion

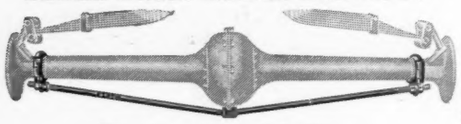
The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

TRUCK ACCESSORIES AND APPLIANCES



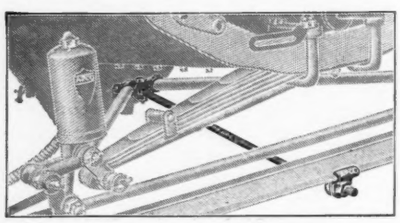
APCO SPECIALTIES FOR THE FORD DELIVERY CAR

The Auto Parts Company, Providence, R. I., has brought out a rear axle truss for Ford delivery cars especially designed to compensate for overloading. A feature of the truss is that it does not impose any strain on the axle tubes, as the clamps securing the truss are attached to the reinforced ends of the axle housings. The truss has a cradle which fits under the differential case, and the cradle has square sockets to take the squared heads that are made integral with the rods. In the clamps is a square recess, so that the bolts are flush with the surface. The truss is adjustable and can be attached in 10 minutes. It sells for $1.50.



The Apco Rear-Axle Truss

The Apco Front Axle Brace is designed to strengthen the front radius rod of the Ford machine and to prevent the axle tipping backward which is stated affects the steering of the car. The brace consists of two ingenious clamps and a steel rod. One of these rods is attached to the V end of the radius rod by three bolts which have square heads fitting into a recess which prevents their turning. The end of the rod has a square head. The other clamp is secured to the front axle as shown, and is held firmly in place by two nuts on the rod, which extends through the clamp. It lists at $1.50.



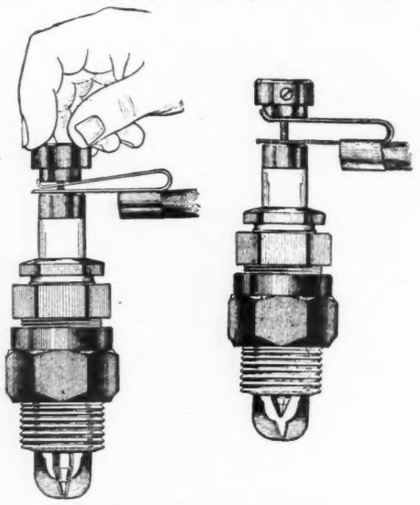
The Apco Front-Axle Brace

The Apco Valve Stem Packing is designed to prevent air being drawn in between the valve stem and guide when these members are worn. It consists of a steel stamping carrying a felt washer which is held against the guide and stem, sealing the opening. The stamping is retained in place by the spring. As the felt is oiled the valve stem and guide are lubricated, increasing their life. The valve stem packings come eight to the set and sell for 50 cents per set.

The Apco Valve-Stem Packing

STONEBRIDGE SPARK PLUG EASY TO CLEAN

The interesting feature of this plug is that it can be cleaned instantly without removing it from the engine. To remove carbon from the sparking points it is only necessary to press down on the cap and twist it around a few times. The porcelain can be cleaned by removing the brass bushing from the plug, wiping off the porcelain and replacing the bushing. The sparking points will be in the same position as they were before removal. Price is $1.25. Manufactured by the C. H. Stonebridge Manufacturing Company, 10 Wall Street, New York City.

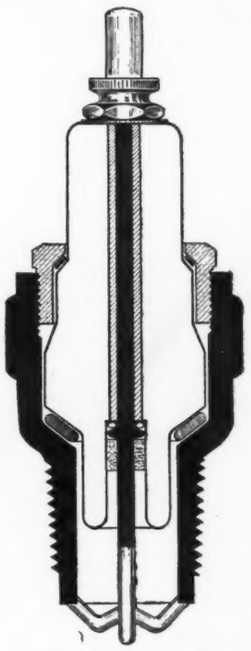


The Stonebridge Spark Plug
Showing the easy manner in which this plug can be cleaned

THE RED ELEFANT SPARK PLUG

These plugs are sturdily and scientifically designed to meet the heavy requirements of the present day engine. The line includes the following types: Jumbo Jiant, a heavy duty plug for heavy duty motors, and Jumbo Junior, especially constructed for medium type motors. Both types are made in S. A. E., ½ in., metric and special Ford sizes. The plugs are the product of the Gibson-Hollister Manufacturing Company, 3380 Washington Street, Jamaica Plain, Mass. Jumbo Jiant sells at $1 and $1.25 with porcelain and mica insulation, respectively; Jumbo Junior at $.75 and $1.

The hand-turned porcelains, made from imported clays, are guaranteed heat-proof, and, as shown in the half section, are held at the top of the bushing. This, together with high compression, copper-asbestos washers, above and below the porcelain shoulder, makes it impossible to crack or break these insulators, except by a hard blow. The lower end of the porcelain is heavily constructed, placed well back in the shell and skirted to prevent sooting.



Section of Jumbo Jiant Spark Plug
Showing husky proportions

The special finish on the shell is an entirely new product. It is an absolute rust preventive, will withstand 1500 degrees of heat, is very durable, and preserves a neat and attractive appearance at all times.

The firing points are made of a highly conductive alloy wire, ⅛ of an in. in diameter, and will not burn, flake or pit. Shell electrodes are fastened at both ends, thus keeping them from being twisted or forced out of position. They are bent up in the middle to allow oil to flow away from the firing points, thus preventing fouling. The universal terminal on the top of the electrode will fit any connection, while the electrode itself is hermetically sealed in the porcelain, thus preventing compression leakage.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

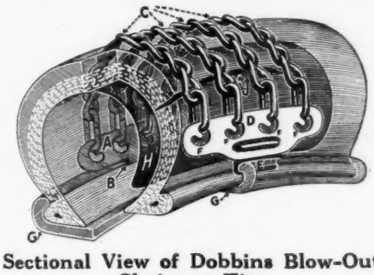
NEW PEERLESS BOOTS FOR TRUCKS

In view of the growing demand for Tire Boots, the Leather Products Company, of Denver, Colo., has recently added four new Tire Boots to its line—one of which is illustrated below. It is made of the best selection of "Elk" Tanned Leather, treated and waterproofed by a secret method. The body is cut from finished stock and is reinforced on the tread portion with an extra wearing sole of "Elk" leather, which is closely studded with flat head steel rivets to take the wear. This boot is guaranteed not to creep or slip on the tire. It is made in both hook-on and strap styles ranging in price from $1.40 to $3.

The Peerless Tire Boot

DOBBINS BLOW-OUT CHAIN

This is the latest addition to the line of the Weed Chain Tire Grip Company, Bridgeport, Conn. It is attached to the shoe, when the tire is deflated, and the torn rubber and fabric drawn together, when the tire is inflated. It is claimed that sand and water cannot get between the shoe and tube when the chain is in place. The chains are put out in different styles for straight side and clincher tires. The device can be applied with a screw driver. An inner patch, to be placed under the blow-out, is provided with each chain.



Sectional View of Dobbins Blow-Out Chain on Tire

A, main plate; B, bent lip on main plate; C, cross chains; D, second plate; E, auxiliary hook; F, curved slots permitting adjustment for due amount of tension; G, rim of wheel; H, inner patch placed inside of shoe; J, blow-out.

WOOLF GRAPHITE LUBRICATOR

When cylinders become worn or scratched, it is the practice of many motorists to use graphite to help the engine retain its compression. The graphite is sometimes inserted through the spark plug hole, or held under the air intake of the carburetor, whence it is drawn into the cylinders. Desiring an easier and cleaner method, S. P. Woolf, 3024 Ames Avenue, Omaha, Neb., developed the lubricator illustrated herewith. This lubricator is screwed into the intake manifold, where it branches. If this is inconvenient, the lubricator can be placed where desired, connection to the intake manifold being by ¼ or ⅜ in. tubing.

The 1¾ in. screw top allows filling with graphite, without using a funnel. At the lower end of the device is a cock, with a passage only half way through. When the opening is turned up, it is filled with graphite when it is turned down the graphite is taken into the intake manifold and thence to the cylinder.

Woolf Graphite Lubricator

A NEW JACK—THE SIMPLEX

In placing this new jack upon the market, Templeton, Kenly & Company, Limited, 1007 South Central Avenue, Chicago, have incorporated in it besides cold rolled steel and malleable iron, the experience gained in being the largest makers of railroad and industrial jacks in the country.

The feature of this jack is its ability to bite the load at any height. This is made possible by a detachable shoe, and a bottom shoe, both of which are seen in the illustration. Another interesting point is the half lift stroke, which takes half the load on the down stroke and half on the up stroke. This jack is made in four sizes, viz., No. 36, 1000 lbs. capacity, $1.25; No. 41, 1 ton capacity, $3.50; No. 42, 2 ton, $4.25; No. 43, 3 ton, $5. Numbers 41, 42 and 43 are furnished with attachable shoe.

The Simplex Jack

THE VEEDER HUB ODOMETER

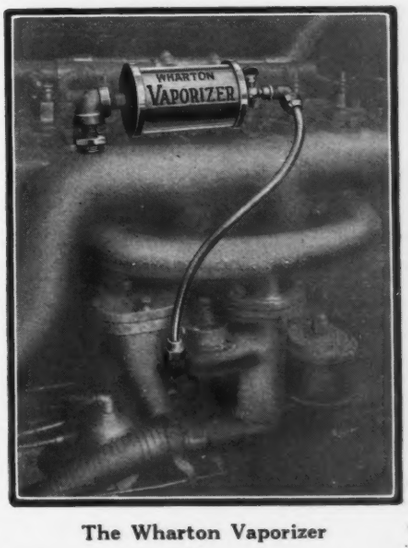
Owners of delivery cars and taxicabs will find this instrument of value, as it records (by .1 miles up to 100,000 miles and repeat) every movement, both forward and backward, that the machine makes. It cannot be tampered with, without the owner's knowledge, and it is impossible to deduct mileage by revolving the wheel backwards. This gives the owner a record whereby he can compare the returns and mileages of his vehicles, and, in this way, obtain the most satisfactory results from them. It is marketed by the Veeder Manufacturing Company, Hartford, Conn.

Veeder Hub Odometer, $15

THE WHARTON VAPORIZER

This device improves engine operation and gives greater fuel economy, by superheating and drying the air and gas before entering the cylinders, thereby keeping the mixture uniform under every climatic condition. It is manufactured by the Wharton Vaporizer Company, 5023 North Broad Street, Philadelphia, Pa.

The vaporizer is tapped into the exhaust manifold, the hot exhaust gases being cooled to a certain known temperature by passing through a series of cylinders in the vaporizer. The gases, still hot, are piped into the air intake of the carburetor striking the mixture. This breaks up the gasoline particles thoroughly, vaporizing and drying the mixture, thus requiring a smaller amount of gas and increasing the engine efficiency.



The Wharton Vaporizer

THE EUREKA SHOCK ABSORBER

The Auto Accessory Manufactory, Canisteo, N. Y., calls attention to its new shock absorber for commercial cars and light delivery vehicles. This device is made in four sizes: for cars up to 2000 lbs., $10; 2000 to 2800 lbs., $15; 2800 to 3500 lbs., $20, and 3500 to 4500 lbs., $25.

The two-piece telescoping case is threaded on the ends for securing to the end pieces. The case is seamless tubing. Inside the

Eureka Shock Absorber
Telescoping case with two coil springs, one for heavy and the other for light shocks

casing are two coiled springs; the smaller is short and comes into play only with heavy loads; the outside spring is 2 in. in diameter, of steel heavy enough to carry the load and still be flexible and soft, so that it does not become strained or broken. This spring takes care of the light bumps.

When the car spring is compressed, the top piece to which the upper casing is attached slides down the side pieces; the center bolt attached to the other shackle also goes downward. On the upstroke, the top piece is held from going upward by the shoulders on the side pieces, and the center bolt goes up, compressing the spring and cushioning the upthrow, this being a valuable feature. As the spring works both ways, it cushions upthrows and "smooths the road," by compression of the springs. At the top are two sets of holes, one set being offset. If the shackles are in a line perpendicular to the ground, the holes are used, as shown in cut. If the shackles are out of line, the offset holes are used. This allows the shock absorber to hang perpendicular to the ground.

Fafnir Bearing Company, in order to keep in closer touch with its customers in Ohio, Indiana and Michigan has opened a branch office at 752 David Whitney Building, Detroit.

THE TOPPING TRUCK JACK

A new type of screw jack is being introduced by Topping Brothers, of 122 Chambers Street, New York City. The feature of this jack is that the screw produces a rise at both ends, thus working twice as fast, at the same time giving that positiveness of lift which is characteristic of the screw jack.

The Topping Truck Jack

The right-hand thread on the upper end engages with the traveling lifting head and the left-hand thread on the lower end with the standard—both head and standard being enclosed in a protecting case or shell. On the center of the screw is fitted a bevel gear which meshes with a bevel pinion—this pinion being actuated by a ratchet into the socket of which the handle is fitted.

The jack is reversed by throwing over a small pin located at the base of the handle socket. The truck jack lists at $8.50, equipped with the swivel side lift head as illustrated.

THE "SAFETY FIRST" FIRE EXTINGUISHER

The Hansen-Nieter Safety Company, 103 Park Avenue, New York City, is marketing a portable fire extinguisher which is designed along the latest approved lines of fire fighting apparatus. The cylindrical tank measures 17 in. in height by 4 in. in diameter. It is constructed of seamless brass tubing, with heavy bronze top and bottom castings, and an ingenious discharge pinion makes the extinguisher absolutely fool-proof, and yet simple in operation. The extinguishing fluid consists of a chemical combination of organic material, which emits an aromatic odor and is of high specific gravity. It is non-corrosive, non-damaging, and a non-conductor of electricity. The extinguisher throws a stream a distance of 35 ft., and lists at $6.75.

SHELDON WORM-GEAR AXLE FOR ONE THOUSAND POUND TRUCKS

The Sheldon Axle & Spring Company, Wilkes-Barre, Pa., announce having placed on a manufacturing basis a worm-gear rear axle, model W-1000, suitable for light delivery cars of 1000 lbs. capacity. The first experimental axles were placed in service over a year ago, while four more axles have been in service for the past seven months, under test trucks of various customers in different parts of the country, where they have given such excellent satisfaction that contracts have been closed for several large quantities.

The special tools, jigs, and fixtures necessary to manufacture these axles in large quantities, and to insure interchangeability of parts, have all been completed, and large quantities of these axles are now being completed for a firm who will shortly announce a delivery wagon of this capacity that will sell at less than $900.

The axle is designed along the same lines as the other Sheldon Worm Gear Axles, incorporating the straight type of worm and wheel in a semi-floating axle construction, producing the simplest axle made both in number of parts and in the character of parts; in addition to being extremely light in weight, both because of the elimination of parts and the general design used in its construction.

The housing is pressed steel, and is pressed and riveted to cast-steel spring seats and brake spiders. Special attention is called to the mounting of the hub on the axle shaft, by means of taper bushings, which permits the wheel to be easily removed without the aid of a wheel puller.

Double internal cam brakes, with 14-in. brake drums, gives a high braking efficiency, at the same time adding to the clean appearance of the axle, as all the brake parts are inside the brake drum. Non-skid chains can always be used without any danger of their interference with the brake levers, as these are extended inside the frame, are mounted in hardened and ground bushings and well lubricated.

The axle shafts are 2 in. in diameter at the outer bearing, and are tapered from the bearing collar to the differential. The reason for this is to provide a uniform stress at all sections of the shaft.

A special secret formula of steel is used for the worm, and after the heat-treatment has been accorded, the manufacturing process calls for grinding and polishing. This puts a smooth finished surface on the worm and at the same time eliminates any distortion that might have taken place during the heat treatment. As the grinding is done to within close limits, the finished worms are all of a size within very close tolerance, permitting of perfect interchangeability at this point. Ball-bearings are used throughout.

New Sheldon W-1000 Worm-Gear Rear Axle

The CCJ has most advertisers because it gives them biggest returns

The War and Civil Transport

Effect of Military Demands on Commercial-Car Working

By OUR FOREIGN CORRESPONDENT

Four Main Differences

UNDER the circumstances it is only natural that we should have heard so much of automobile transport conditions at the war front, so little of the effect that war has had on civilian transport. Already we can see the probable lines of mechanical development of the heavier types of commercial car, but to get an even possibly definite idea of its economic development we must investigate the effect of war's demands on civil life. For practical purposes civilian commercial car work in France does not exist; accordingly I have spent a considerable time with the heads of some of our leading transport organizations and transport-using firms in Great Britain to investigate the present trend.

Broadly speaking, the effect of the war is seen in four main factors—increased cost of material, restricted transport equipment, labor shortage, and increase cost of living and consequently of wages.

Dearer Material and Its Effect

In talking about enhanced price of raw material it should be understood that the term covers a very wide range, for not only does the price of iron, steel and rubber have to be considered, but such indirect matters as the price of horse fodder enter into the question. Like everything else, the cost of horse-keep has risen, and this must have an important bearing on transport methods.

Difficulties of Truck Equipment

But after all, what chiefly matters is the rise in the price of materials which more directly effect the industry. This has resulted in the cost of the new manufactured car being advanced at least 10 per cent., and this enhanced price of new machines to replace those that have been requisitioned has adversely effected results. It is, therefore, all the more significant that in the face of this men who have had experience in the use of the commercial automobile over here still find it worth their while to acquire new vehicles.

It is true that in the case of firms using the heavier types of car that the new vehicles are not always of the same size. I know one firm, that had had all its best cars taken, had the luck to pick up second-hand a Commer-Car that had only been run for 3 weeks, and they managed to have the use of this for some 6 months before the eagle eye of the requisitioning officer spotted it, and it was bundled out to the front. In some cases the users have been able to buy American trucks, but in the cases that I have come across the prices have been considerably higher than those of British trucks, supposing that any had been available.

For the most part, commercial car users have either hired trucks, obtained smaller vehicles, or taken to horses. In view of the terrible drainage that the war is making on horse flesh this last may sound surprising, but only certain classes of horses are requisitioned for war purposes, and there is no difficulty in obtaining horses of a type not wanted for military service.

Some few users have substituted the dear departed three-tonners for two-ton trucks, but obviously this means a loss if their businesses are of a nature to keep three-tonners employed. Yet, in many cases, the war has modified the nature of the business. Take one example—the Direct Supply Aerated Water Company—a splendid business which has been built up to supply the customer direct. Mr. E. Goddard, of this firm, informs me that events since August last have had an undoubted influence on business: housekeepers are more careful, and many customers, hitherto supplied weekly, are now only supplied fortnightly. Circumstances such as these have, in certain instances, rendered a change to smaller capacity trucks possible, or even desirable.

Lastly, there are certain retail firms who, having lost their cars to the army, are now hiring from motor transport companies, some of which seem to have suffered not as severely as the delivery departments of retail firms. I know one case of a firm, employing nothing but heavier vehicles, that now contracts for its trucks, and apparently the contracting firm has experienced no difficulty in supplying them with the heavier types. The trucks may not be in as good condition as those taken by the military, but they appear to keep running with absolute regularity.

Difficult to Get Good Drivers

One of the greatest difficulties is to obtain suitable men for drivers. Before the war there were plenty of good drivers; now the quality of the labor supply is deplorable. One firm—the National Cab Company that does a considerable business in providing business houses with light vans under contract mileage—would never take on a driver unless he had had 2 years' experience; now they have had to forego this stipulation.

The Lady Van-Driver

This company, by the bye, is making a very interesting experiment in the employment of women van drivers, which has attracted a lot of attention in the press and led to a great deal of inaccurate information and absurd inferences. Mr. E. A. Greathead, the managing director of the National Cab Company, tells me that the idea originated with a woman, and that at present, they are employing four women drivers, but purely as an experiment. Whether or not the ladies will "stick it" remains to be seen. Another point in considering such an idea for the future—the women are not the class who would adopt van-driving as a permanent profession: for the most part, they have owned and driven their own cars (one is a singer), and finding themselves in temporary embarrassment during the war, have enterprisingly seen the possibilities of filling the gaps left among the men. From what I can see, however, the permanent employment of women as van drivers is very doubtful. They drive quite as well as the men—a lot better than many of the present men (as well they might). But it is one thing to drive when all goes well, quite another to meet trouble on the road, though the fact that they are at present only employed on quite light vans minimizes this difficulty; on heavier vehicles it would be very different. Few, if any, women outside a circus would have the physical strength to start some of the bigger, high compression engines; while as for any heavy repair trouble, with a wheel, for instance, repairs would be impossible.

Wages Rising

But while the quality of labor has fallen off, its price has, generally speaking, risen, more particularly in the more skilled ranks. Conditions in this respect, however, seem very unequal; though most firms have advanced, or are advancing, their men's wages, some are making no alteration. But for the most part, wages have risen from 1 to 2 cents an hour, according to the type of employment, which represents about 10 to 12½ per cent. rise. In some cases—notably that of the National Cab Company—for the drivers, a bonus system is being introduced, as some means of counteracting the necessary defects of the lack of trained men.

The CCJ has most readers because it gives most information

Notes on Steel Wheels

Some English Experiences, Opinions and Developments

THOMAS CLARKSON is a personage well known in the heavy motor industry of Great Britain as one of the few remaining effective protagonists of steam as motive power, and in that capacity as the designer of the successful steam omnibuses in London. His experience, therefore, of running conditions is such as to entitle him to respect when he gives his view on wheels, as he did recently in a paper before the Institution of Automobile Engineers in London.

Best Seasoned Timber Difficult to Obtain

In Europe this question of wheels is of more importance than in America, because we do not grow the same supplies of seasoned timber, and there seems no doubt that Europe does not obtain really the best from overseas. Hence, the steel wheel finds more employment in the eastern hemisphere than in the west.

Built-Up Steel Wheels

Besides the ordinary cast-steel wheels, with which our readers are probably familiar, certain of the built-up type were described, the first step being the wheel with cast center and wrought rim (Fig. 1), The next step is afforded by one of Mr. Clarkson's own design in conjunction with Mr. Morrison. In these forged steel is the only material employed. The hub, shown separately, is a drop-forging formed with bosses ready for the tubular steel spokes, which are welded electrically under pressure to the hub and rim flanges. To preserve uniformity of section, and to avoid, as far as possible, internal stresses due to a sudden change of section, butt welding is employed. The rims, which are pressed up from steel plates, each have one flange turned outwardly to form a stop for the tire, and the other turned inwardly (see Fig. 4). Formerly they were machined inside and out, but this has now been found unnecessary, and the sockets for the spokes are united to the rim either by riveting or spot welding.

For this wheel freedom from internal stresses, greater ease of material inspection, and a perfect balance is claimed, the admitted chief drawbacks being higher cost; however, economies of manufacture are being effected. Some of these wheels have been subjected, with success, to very severe tests of many thousands of miles at high speed (up to 30 m.p.h.) over all sorts of roads, without any rubber tires.

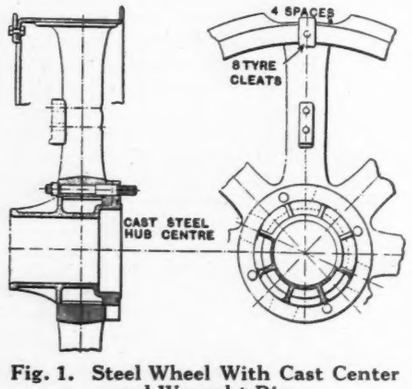


Fig. 1. Steel Wheel With Cast Center and Wrought Rim

Plate Wheels

Another wheel which has been brought out by Ruston, Proctor & Company, Ltd., a big Lincolnshire engineering firm, is seen in Fig. 5, which shows how it is made with two circular dished plates which are secured by rivets near the rim to a central distance plate. The chief drawback to this wheel is its heaviness, and, though not mentioned in the paper, the fact that in certain wheels it renders lubricators and brake-drum attachments inaccessible. No mention was made of a plate steel wheel which Thornycrofts have recently brought out, and in which the plates are cut out to give access to lubricators and brake-drum attachments, though incidentally this cutting out lightens the wheel and so lessens one of the biggest drawbacks of the type.

Retaining Flanges—Doctors Differ

The use of a retaining flange Mr. Clarkson did not consider necessary, or, indeed, advisable, especially where the vehicle was frequently run close to the curb owing to the risk of serious injury by contact with the curb, though it was suggested by another speaker that the rim fastenings could be protected by forming the rim with an outwardly turned flange of sufficient depth. He thought it best to rely on the pressure with which a tire is put on than a retaining flange which might become damaged.

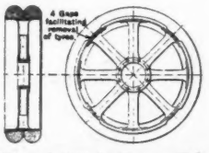


Fig. 2. Wheel With Drop-Forged Hub and Tubular Spokes

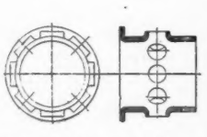


Fig. 3. Hub of Wheel Shown in Figure 2

Fig. 4. Flange Rim of Wheel Shown in Figure 2

Much difference of opinion is expressed as to the use and number of rim slots for the detachment of tires. The author of the paper, while agreeing with their principle, considered four sufficient even for the biggest twin tires in spite of the recommendation of the British Engineering Standards Committee in favor of six slots. Indeed, a good many references were made to the standardization sizes and to the comparison of British practice with American, but as these standards have already been mentioned, there is no need to further dilate on this particular aspect.

Hub Bearings—Plain, Roller or Ball

Discussing the merit of hub bearings, on the whole, the author was in favor of roller bearings, one on each side of the hub and so constructed as to remain encased with all their parts securely held together, when the wheel was removed. Both roller and ball bearings need less lubrication attention, but are less able to resist shocks than the plain bearings. As to cost, this was all in favor of plain bearings, though there is little to choose between the ball and roller types. Where plain bearings are used Mr. Clarkson recommended that they should be provided with hardened steel surfaces accurately ground, and with a floating bronze or gunmetal bush between these hardened surfaces, the said bush being drilled, usually spirally, to facilitate the flow of lubrication between the two surfaces.

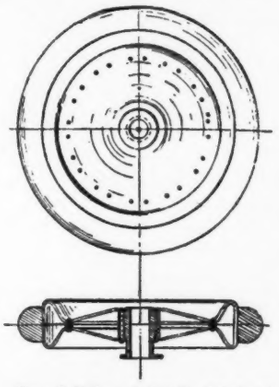


Fig. 5. Steel Wheel With Dished Plates Secured by Rivets Near the Rim to a Central Distance Plate

Concerning the behavior of cone roller bearings, it was stated that while they had the advantage of adjustability, these bearings were not generally interchangeable, owing to a ridge formed by wear either on the cone roller, or on the edge of the roller race.

Another useful point was made—the dangerous time for ball or roller bearings is when changing wheels; then they are often exposed, and it sometimes happens that part of the bearing slips out of the hub on to a wet or dirty floor, and is replaced without first being thoroughly cleaned. Under such circumstances depreciation is very rapid; even the presence of water is particularly damaging to ball or roller bearings.

Some Figures of Cost—The Effect of Frost on Cast-Steel Wheels

During the discussion some speakers gave interesting particulars as to cost. Mr. Garrard mentioned cast wheels imported into Great Britain at $70 to $90 the set complete and machined, while the cored spoke type of wheel usually cost $100 to $130 a set. Another speaker, Mr. Thomas, however, dissented from these figures, saying that he knew of wheels like the last type, for four-ton vehicles, that could be obtained completely machined at $80 a set.

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

THE LATEST EUROPEAN HEAVY-DESIGN DEPARTURES FROM SUBVENTION SPECIFICATION

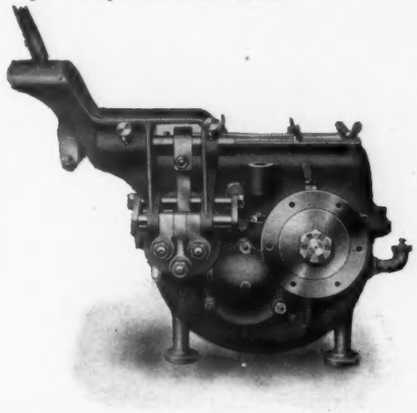
IN view of the very great influences that the war will exert on motor truck development, the first British design—the Caledon—to make its appearance since we have been in possession of any considerable knowledge of the new requirements is worth attention. These new commercial cars are now made at Glasgow in three sizes of three, three and a half and four tons, but as in their broad design they are all similar—except in dimensions—a single wide description will suffice all three models.

Side-Chain Transmission is Adopted

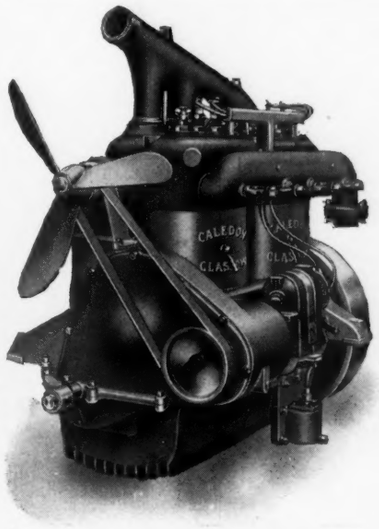
It is not altogether surprising to find a reversion to the old side chain drive with the differential countershaft, bevel driven from a shaft of considerable length, the gear box being reasonably close up to the engine, which in the three and three and a half ton sizes gives 32 h.p. (4 5/16x5½ in. bore and stroke) in the four tonner 40 h.p. (4 23/32x5½ approximately).

Also Thermo-Syphon

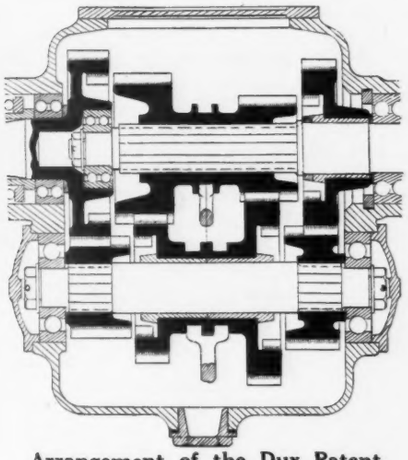
Though thermo-syphon circulation is employed, the engine is a type which has been awarded the British War Department subsidy certificate, but apart from the fact that the crankshaft and big end bearings are lubricated by oil forced through a hollow crankshaft, and that the clutch, which is lined with Ferodo asbestos and copper fabric, is easily detachable for renewal; there is little information that cannot be imparted by the illustrations.



Caledon Gear Selector Arrangement

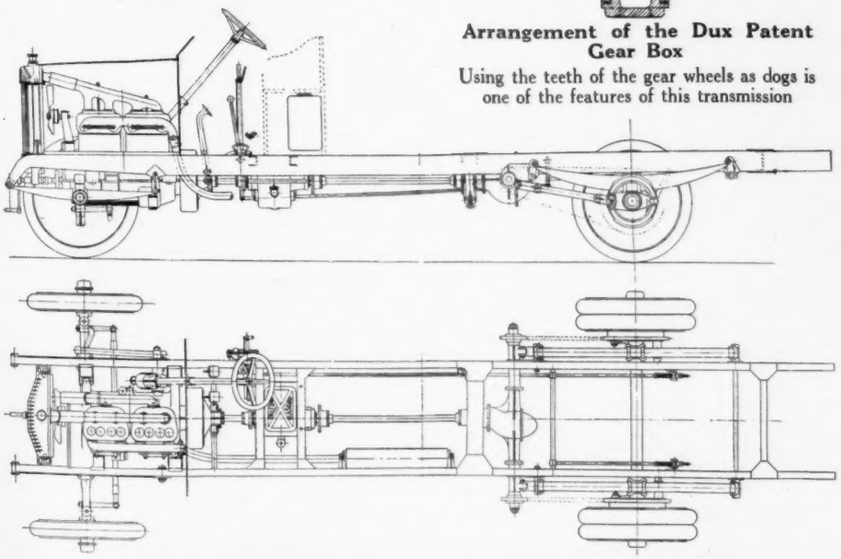


The Four-Cylinder Engine is a Businesslike Job



Arrangement of the Dux Patent Gear Box

Using the teeth of the gear wheels as dogs is one of the features of this transmission



Showing the General Layout of the Caledon Chain-Driven Cars

The Gear Box the Feature—The Paris Omnibus Design

A noticeable feature about the gear box for an English design is the fact that with it is incorporated the selector and gate mechanism, so that the whole is self-contained, and not liable to be jammed in working by any distortion of the chassis frame.

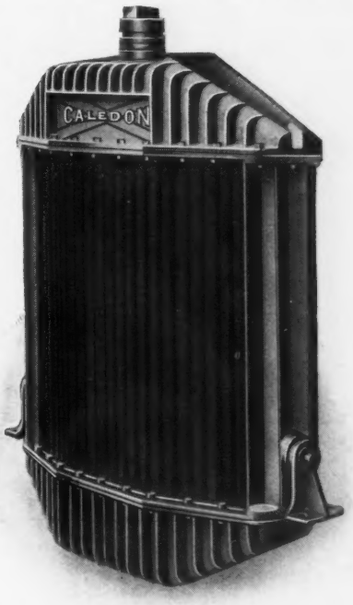
It is in the gear box that the chief interest lies, for this is devised on the Dux patents, and is the same arrangement as is used by the Paris General Omnibus Company. The chief departure from ordinary practice is seen in the use of the teeth of the gear wheels as dogs.

All gears, including the reverse (not shown), are made from nickel chrome steel, and their action is controlled by a gate lever. At the normal 1100 r.p.m. of the engine they afford speeds of approximately 4, 7½, 11 and 16 m.p.h.

Another point about the gear box is that following the practice of the London General B type the lugs, that were originally cast on the gear boxes to facilitate machining in the manufacture, have been left on to facilitate repairs if need be.

An Accessible Countershaft

One of the few other features that call for remark as not being at once apparent in the illustrations, is the design of the countershaft, which is specially arranged for accessibility: either of the sprocket shafts can be withdrawn by removing two bolts which keep in place the thrust ring. By taking the inspection cover of the crown wheel casing off and then removing the caps which hold the ball bearings of the differential casing, the shafts can be slipped outwards, and the entire differential casing removed. Also a provision is made for adjusting the bevels of the drive.



The Caledon Radiator

Radiators, made up of small tubes expanded into aluminum or cast-iron header plates, easily accessible by removing the cast top of the radiator tank, are general in British commercial cars. The Caledon bow-front radiator shows the latest fashionable tendency. Note also trunnion suspension.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

Motor Truck Design and Construction Made Plain

Advantages and Disadvantages of Different Types Discussed

By C. T. SCHAEFER, Member Society Automobile Engineers

This is the fifteenth installment of a series of articles by this well-known writer, covering in a non-technical way the various constructions now current practice in commercial car design. These articles take up, in order, the general types of chassis, the advantages and disadvantages of each, illustrated by simple diagrams, and in logical order, motor construction, ignition, carburetion, cooling, lubrication, etc., until each part of the truck has been dealt with.

PART XV

FRONT AND FOUR-WHEEL DRIVES

In the foregoing installments on the final drive, we considered all types of final rear wheel drives. There is also a number of commercial cars, in which the final drive is through the front wheel, and others in which it is through all four wheels. Both of these types have gained considerably in popularity of late. This is possibly due, to some extent, to the demands of the various war departments, for motor-driven vehicles, which can propel themselves to any point where mules can pull a wagon.

This same ability is also of great importance in many other classes of service, where departure from the road surface is sometimes necessary. It is especially of importance to coal dealers, who are generally called on to make deliveries in narrow, unpaved alleys; excavating contractors, who must haul material in and out of excavations, building supply concerns, handling such as lumber, gravel, brick, etc., over unpaved roads and sometimes across swampy land to deliver the material to the building site. There are also other cases to which the four wheel drive is adaptable.

There is also a variety of cases, in which extremely low bodies are necessary, as in hauling long structural girders, timbers and heavy stone. On the other hand, there are such problems as handling light paper boxes, paper and tin cans and tubes and other articles which present a very bulky load. For these purposes, the front wheel drive lends itself to best advantage, while it is also of considerable advantage for fire apparatus, etc., where it is desired to retain the vehicles used with the horse equipment.

Foreign manufacturers were the first to experiment with these types of vehicles and have perhaps led the way; however, there are a number of companies in America, which are prepared to manufacture these types of vehicles. As the front wheel and four wheel drives are closely related, and practically involve the same mechanical problem in driving and steering, they will be considered together.

Four Methods of Drive

In comparing the various designs we find four methods of driving and two methods of steering. In the first construction, the whole axle pivots about its center and the wheels are driven, as in the ordinary dead or live rear axle. This construction is mostly used with front drive units, that is, in vehicles propelled through the front wheels only. In the second type, the axles have steering knuckles, as in the conventional type, but the flexibility is obtained through universal joints or chains driving the wheels through internal gearing. In the third type, the wheels are driven through bevel gears mounted inside the wheel and on the steering knuckles, another pair of bevel gears mounted on the steering knuckles driving the wheels, through shafts extending from the central pair of gears in the axle housing. These three are termed mechanical drives; while the fourth construction is a non-mechanical drive, electric motors being mounted in the wheels and driving direct through reduction gearing.

The front wheel drives, in some cases, are so constructed that this forms the power unit, which may be attached to any type of vehicle the user may desire, while a rear frame construction, upon which any type of body can be mounted, may also be provided. With the latter, the rear wheels may be shod with steel or rubber tires as desired. The Devon, Pull-More and Meyers may be mentioned as examples of this type.

Whole Front Unit Pivoting Chain Drive

Referring to Fig. 27, illustrating the Devon Tractor Trailer, the engine is mounted in front of the axle and placed lengthwise. It is located toward the left side and enclosed by a metal hood. At the rear of this hood is the vertical steering column, and back of this, a metal seat. The power from the engine is transmitted to the clutch and transmission at the rear, the transmission being a unit with a jackshaft, as in the ordinary chain driven truck. The front axle is similar to the ordinary dead rear axle, and carries a set of brakes and sprockets. From the jackshaft, the power is transmitted to the

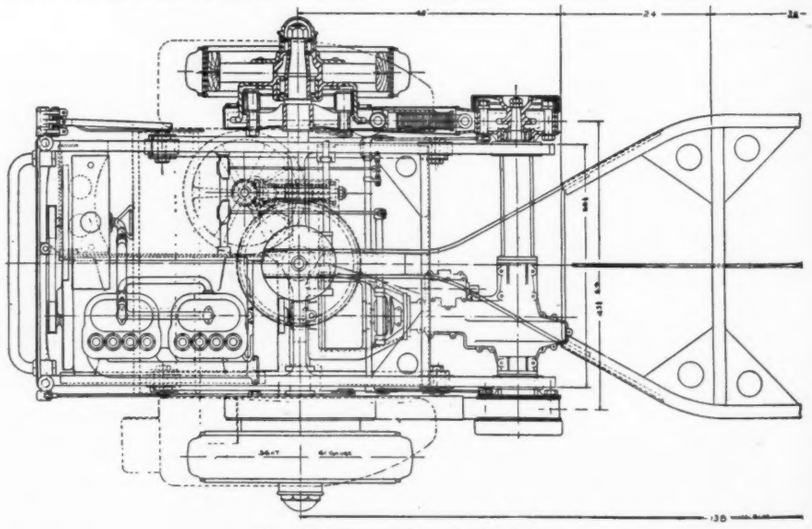


Fig. 27. Devon Tractor Trailer

Steering is by hand wheel operating a worm meshing with a large worm wheel concentric with the pivot and rigidly attached to the trailer portion. The worm is mounted between stiff coil springs to prevent road shocks reaching the steering wheel. Jackshaft drives sprockets on front wheels, by enclosed chains. The front axle is one piece, the usual knuckles being absent and the whole axle turning for steering.

The CCJ leads in circulation, advertising and prestige

front wheels through chains, which are enclosed. In steering, the entire unit is turned bodily by means of the steering wheel, which, through bevel gears, rotates a worm, engaging the circumference of a large worm wheel attached to the forward part of the main frame and concentric with the pivot. This worm is mounted on a splined shaft, between heavy coil springs to absorb the road shocks.

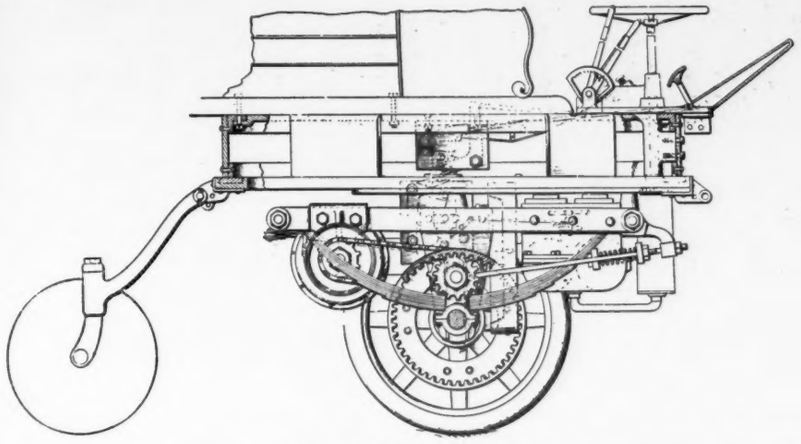


Fig. 28. Meyers Tractor
Similar to Devon method of drive, but the pinion has a pivotal mounting, which permits it to roll in the internal gear to a slight extent, thus reducing the strain of starting

The Pull-More front drive is similar to the above; but has a power steering device operated by the engine, this steering device working through a sprocket on the crankshaft, which, by means of a chain, drives a countershaft, located in the lower half of the crankcase. This countershaft operates the arm of the steering reach, which is a part of the king bolt. This king bolt is located midway between the front wheels, and forms the axis upon which the entire front unit revolves. Differentials are provided to permit right- and left-hand steering. An ordinary steering post and wheel is used to operate the power steering device.

The Meyers front drive, Fig. 28, is similar to the above types, in that the engine is placed forward of the front axle. The power of the motor is transmitted from the jackshaft, through side chains, to a shock absorbing bracket, carrying another sprocket attached to a short shaft, on the opposite end of which is a small gear, meshing with a large internal gear, bolted to the spokes of the wheels. The main frame is mounted upon semi-elliptic springs. The upper frame, which forms the pivoting member, has a detachable castor-like wheel and, as the weight is to the rear of the unit, it is perfectly stable and can be driven from place to place. The vehicle is steered by means of a circular rack and pinion, upon a fifth wheel. The shock of starting is eliminated by a patented arrangement on the driving pinion. This pinion is mounted on an arm pivoted by the axle and is free to roll in the internal gear to a slight extent, its forward motion being limited by a positive stop and its rearward motion by the rod and spring shown.

Gear Drive

In the types described above, the power is transmitted to the wheel by means of roller chains. In the Walter trucks, the power is transmitted by shafts and internal gears, along lines similar to the Latil front drive trucks, built in France. The transmission of the Walter is mounted with the engine, to form a unit power plant, which is so located that the flywheel is just in front of the front axle, the entire engine overhanging the axle. From the sectional view of the transmission, Fig. 29, it will be noted that the differential and bevel driving gears are mounted at the front end of the secondary shaft, which is placed above the main shaft. From the differential, extend two universally jointed shafts to spur gear pinions on the steering knuckles, which mesh with internal gears bolted to the front wheels. There is no mechanism whatever back of the driver's seat, and the construction is very compact.

Four-Wheel Drive

The layout is such that the front drive unit does not have to be altered or changed in any way on vehicles, which drive the rear wheels also, the forward unit of the front drive being indentical with the front unit of the four wheel driven vehicle. The secondary shaft of the transmission is extended back to another differential and bevel driving unit, mounted on the frame, directly over the rear axle. This unit also has universal jointed shafts, extending to the rear steering knuckles and carrying spur pinions, which mesh with internal gears bolted to the rear wheels. The rear

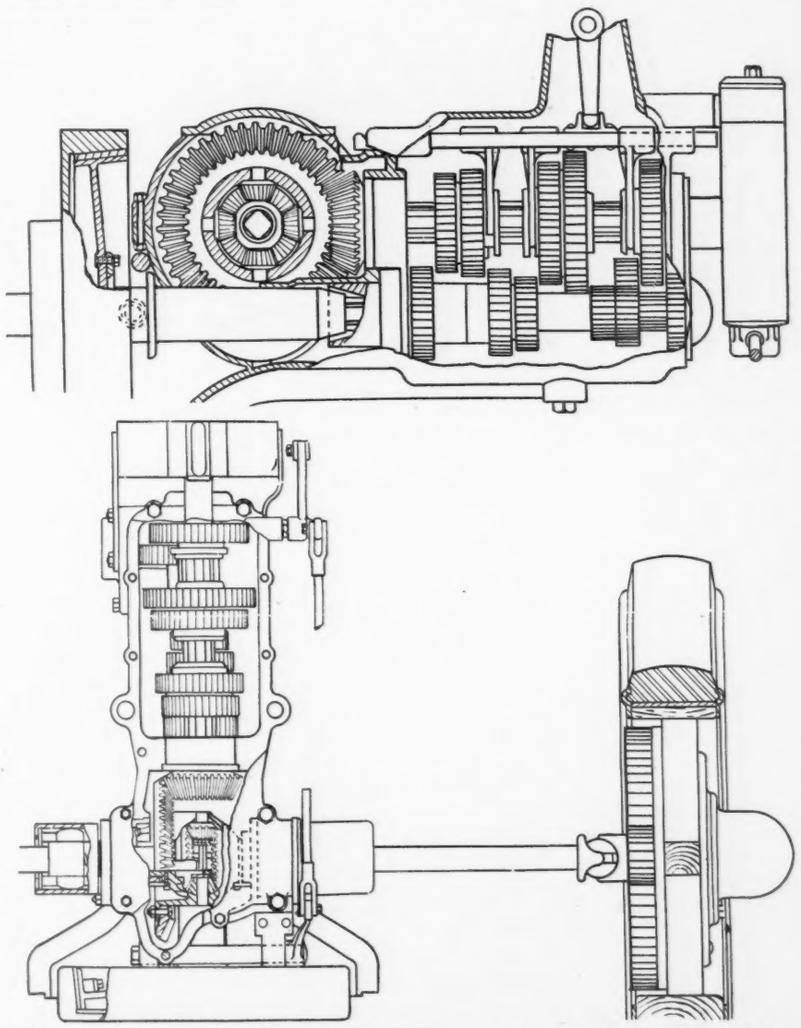


Fig. 29. Side and Plan View of Walter Transmission and Front-Wheel Drive
Differential and bevel driving gears are mounted at forward end of secondary shaft, which is carried above the main shaft. Shafts, with universal joints, extend from the differential to spur pinions, which engage internal gears on the wheels.

The CCJ has most advertisers because it gives them biggest returns

axle is also used for steering in the four-wheel drive, but not in the front drive.

The conventional type of worm and gear steering column is used, with a longitudinal cross-shaft, having a universal joint at its forward end. The rear end of this shaft carries a steering arm, which is connected with the usual linkage to the rear wheels, as shown in Fig. 30.

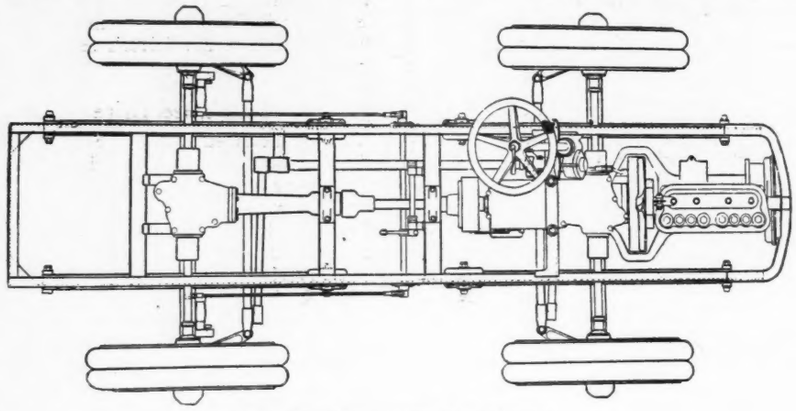


Fig. 30. Plan of Walter Chassis
Showing method of steering all four wheels

The Jeffery and Duplex four-wheel drive trucks are also driven by means of internal gears and universal-jointed shafts. The wheel construction of the Jeffery Quad is shown in Fig. 31. The propeller shafts are driven from the secondary shaft of the transmission. The cross-shafts which drive the wheels, are located above the axle, while the axle carries the weight only and has the driving gear and differential unit bolted to it. The driving pinion meshes with an internal gear, mounted in the wheel. The wheels are cast steel with integral rim, hubs and brake drums. The driving pinion is located above the steering knuckle and driven through a universal joint, the center of which is directly in line with the pivot center of the knuckle.

Combined Chain and Shaft Drive

The Duplex is also driven by means of internal gears in the wheels and universal joints mounted directly over the steering knuckles, and with drive shafts above the springs. However, the method of transmitting the power to the wheels is somewhat different from that described above. The transmission is of conventional design and built in a unit with the engine. Power is transmitted by shaft to a chain case, attached to the frame at approximately its center. This oil-tight chain case, Fig. 32 is the junction point, connecting the front and rear axle drive shafts, the driving sprocket, by means of a silent chain, delivering power to the sprocket, to which the fore and aft shafts are attached. The shaft, on which the driving sprocket is mounted, carries a brake drum, which forms the service brake, acting on all four wheels. Emergency brakes are on the rear wheels. The vehicle is steered by the front wheels only, in the usual manner.

Live-Axle Drives

Another type of four-wheel drive construction is that employing a live front and rear axle; that is, an axle which both propels the car and carries the weight of the vehicle and the load. The F. W. D. and Nevada trucks are of this type.

In the F. W. D. chassis, the transmission is centrally located with a very broad, silent chain, which transmits the power to a shaft parallel to and far enough to one side of the transmission to permit proper clearance between the engine and propeller shaft. Each of the two propeller shafts carries a brake drum, so that the braking force is applied to all four wheels. Steering is by the front wheels only, so that the rear axle is of conventional full-floating design with bevel-gear drive, excepting that the differential housing is located to the left of the axle center.

The steering-knuckle pivot of the front axle, Fig. 33, is in the form of a spherical joint, which has two trunnions, one on the upper side and one on the lower side, so that only a pivoting action, instead of a universal action is obtained. A divided housing surrounds these joints, to which is bolted the spindle, upon which the wheel revolves. This pivot and wheel spindle are hollow and contain the drive shaft and a universal joint. The center of this universal is in line with the center of the wheel pivot and the shaft from one end extends into the differential, while the other end has a square, which fits into the flange that drives the wheel.

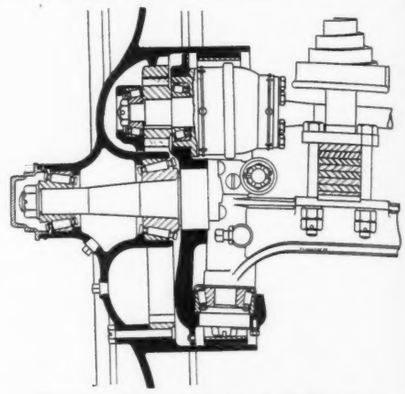


Fig. 31. Jeffery Method of Driving Four Wheels
The driving pinion is located above the axle, and driven by a shaft, with a universal joint in line with the knuckle pivot

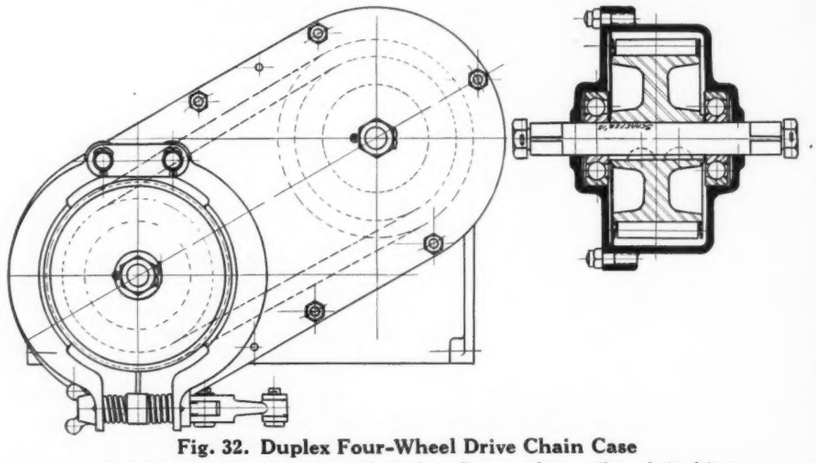


Fig. 32. Duplex Four-Wheel Drive Chain Case
A shaft from the transmission extends back to first sprocket; a silent chain drives the second sprocket, to which are attached the fore and aft shafts

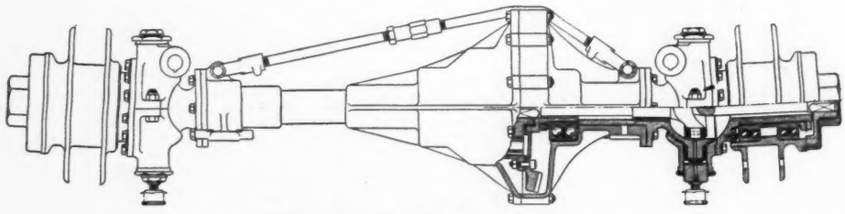


Fig. 33. F. W. D. Front Axle
An example of a live steering axle. Steering-knuckle pivot is a spherical joint with trunnions at top and bottom

In the Nevada, the steering is also by front wheels only. The general application of the power to the front wheels differs somewhat from the above, although this design also employs full-floating axles. In this vehicle, the differential in the axles

is located to the left of the center and the front axle has a somewhat different power-transmitting device in the steering knuckle.

The steering knuckles, Fig. 34, are similar to the usual type, consisting of a yoke at the end of the axle tube, through which passes a king bolt, on which revolves a solid wheel spindle. On the knuckle, which surrounds the king bolt, is revolvably disposed a double bevel pinion. The lower teeth of this bevel pinion are engaged by a bevel at the end of the axle shaft, which is disposed within the axle tube. The upper teeth mesh with a larger bevel gear, this being fastened to a stub shaft extending through the wheel to the outer edge of the hub. The end is squared and engages the driving flange, which drives the wheel.

In the chain-driven vehicles, the thrust and torque are taken by the conventional radius rods, while the remainder are divided between spring and radius rod construction. This is also true of differentials, as some use three and others two, in compensating for the division of power between the wheels.

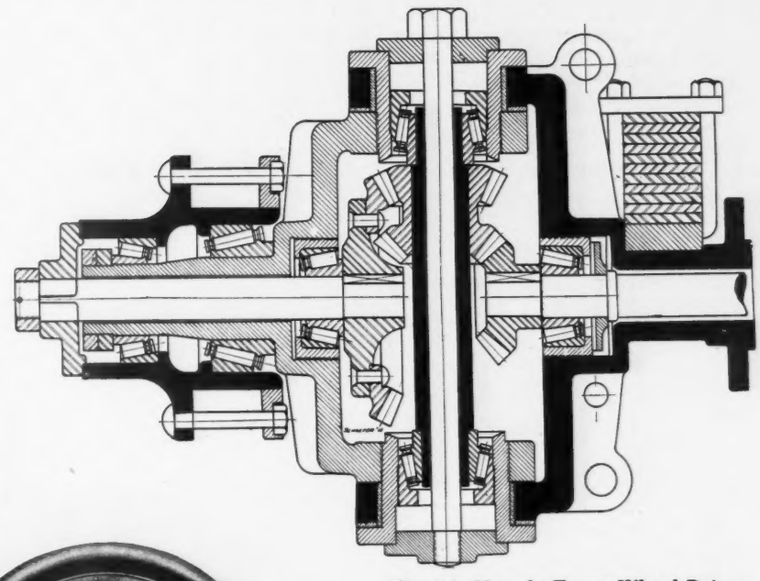


Fig. 34. Nevada Front-Wheel Drive
Shaft drives bevel gear on king bolt, another bevel, integral with the first, engaging a bevel, which drives a shaft, attached to the road wheel.

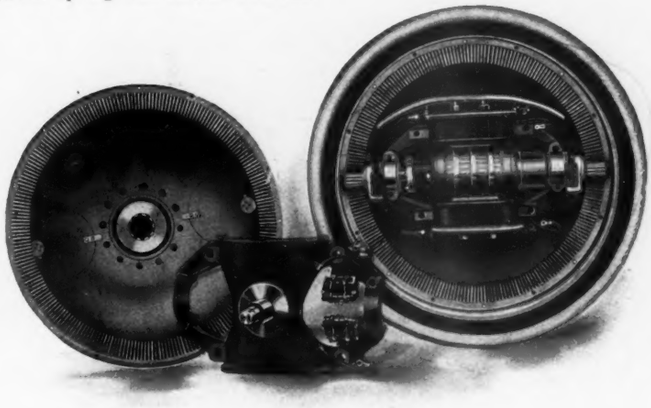


Fig. 35. Couple-Gear Electric Drive
The motor armature has pinions at each end, one pinion engaging one gear, and the other the other

Electric Drive

The fourth type, or electric, is particularly adaptable to one, two or four-wheel drives, and affords a very simple construction mechanically. The Couple Gear Freight Wheel Company makes a type of road wheel, which is constructed from two steel discs, between which is mounted an electric motor. This wheel can be attached to an axle, regardless of whether or not it is pivoted. This company builds two types of trucks, one straight electric and the other gasoline electric. In the former, batteries are used to supply the current to the motors in the wheels, while in the latter type, a gasoline engine drives an electric generator, which furnishes the current consumed by the motors, in driving the wheels. The motor is carried by the steering knuckle, the armature having a pinion at each end, one pinion pulling up on one side and the other pulling down on the opposite side and both mesh with large ring gears attached to the two discs of the wheel. This affords a single reduction of twenty-five to one. A device, which is termed an "Evener," permits of compensating movements and divides the force equally between the two pinions, regardless of any unequal wear or adjustments.

Both front-wheel drives and four-wheel drives are capable of further development, and, if demands for these types of vehicles continue, we may expect to see considerable improvement in details.

The Wichita Falls Motor Company reports more business for the first 4 months of this year than all of last year, only 20 per cent. of which is foreign business, home trade picking up rapidly. It also announce the establishment of what practically amounts to a factory branch at Atlanta, Ga.; also that its trade in the West Indies, and Central America is very gratifying.

INCREASE OF FORTY-THREE PER CENT IN SALES OF SHELDON WORM-DRIVE AXLES REPORTED

The well-known spring and axle makers, the Sheldon Spring and Axle Company, of Wilkes-Barre, Pa., inform us that they have been forced to greatly increase their equipment on account of the demand for worm-driven axles.

The increase in the worm gear axle department shown during the fiscal year, ending September, 1914, is 43 per cent. over the preceding year, which was 23.5 per cent. greater than in 1912. Two 92 in. grinders, two additional oil fires for the drop-forging department, and a great increase in floor space are being provided in the worm-gear department.

CORRECTED CAPTIONS FOR MAY ISSUE

Due to an accidental interchange of cuts in the May installment of this article, the captions, Figs. 19, 20 and 22, do not correspond with the illustrations printed above them. For those who desire to keep this valuable series correct, we are printing below the corrected captions, which can be cut out and pasted in the May issue in their proper places, as follows:

Paste caption Fig. 19 on top of caption Fig. 22 in the May issue on page 30.

Paste caption Fig. 20 on top of caption Fig. 19, on page 29, and caption Fig. 22 on top of caption Fig. 20.

Fig. 19. Pierce-Arrow Worm-Drive Axle
Showing ease of removal of worm, worm wheel and differential unit

Fig. 20. Locomobile Worm-Drive Axle
Housing is in three parts, two ends and a center, bolted together

Fig. 22. Sheldon Worm-Drive Axle
This unit is semifloating type

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

TERPSTRA ELUDES COMPETITION

By W. L. NINABUCK

When Mr. William Terpstra runs into Whiting, Ind., each morning and stops with his piled-high load of garden produce before the grocery store of his first customer, it is very early indeed. The wives of the factory workmen in this limitless manufacturing region south of Chicago are all astir, in and out of the green goods and grocery stores, laying in the day's supplies. They arose while the early summer sun was still a slug-a-bed.

Yet William Terpstra's is the only load on the street. He dashes from store to store, skimming, as usual, the cream off the day's vegetable orders. The earliest and the freshest goods in the Whiting stores are in Terpstra's crates.

In the meantime, on every road outside and leading into Whiting you find the steeds of other truck farmers ambling in with their modest loads. Truck gardening in the region south of Chicago is as limitless as the manufacturing. These drivers are coming in to compete, as usual, for "second best" among the grocers. Terpstra has taken first choice at his leisure.

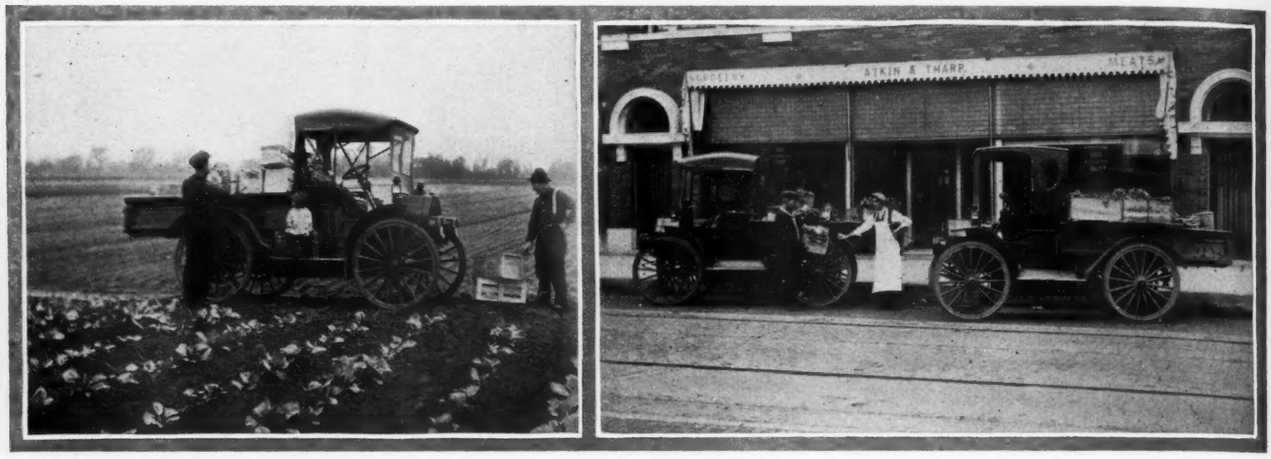
Yet Terpstra does not live nearer by, he has not a better or more direct road, nor does he get up appreciably earlier. He lives down south of Hammond, several miles out of the way, but where, on the other hand, he has found better soil and raises better quality produce than he could nearby. Once this remoteness was an obstacle.

For two seasons now, Terpstra, called "Druggy," because there is a trace of turpentine in his name—has been hauling with a motor truck. He has opened up a new era of truck gardening prosperity for himself.

Upkeep of horses, wagons, and harness, formerly cost him, he estimates, $210 per year; yearly expenses for his solid-rubber-tired motor truck total $150. With his horses the trip into Whiting and back consumed 9 hours, and found him ambling about the streets there amid "a raft of competitors." Now the trip takes 5 hours and he is back among his garden rows at nine in the morning.

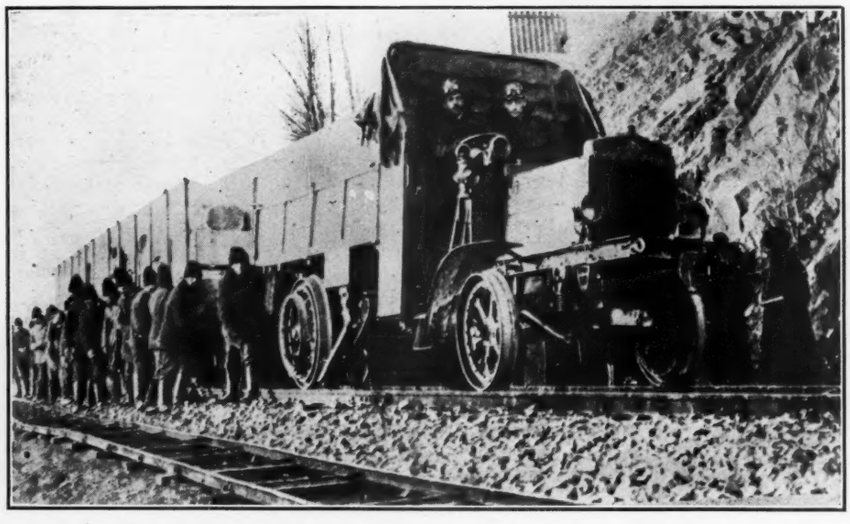
These things he counts among his gains: The almost unsurmountable difficulties presented formerly by the distance of his place from the markets have entirely vanished. His motor truck enables him to get the superior produce from his better soil, in bigger loads, to the best markets ahead of the rush. That combination boosts profits and boosts him in the favor of his customers. He saves 4 hours per day for work on his place. This is an important item during the busy truck raising months—say $75 worth of time. His truck attracts attention and marks him as the up-to-date truck farmer. He does away with the care and feeding of horses during the winter months, when the truck needs no attention.

This season, for the first time, one other trucker's truck has appeared on Whiting's streets to mar the perfect Terpstra horizon, but there is more than ample for both. A half dozen more might come without injuring the advantages they all gain over the horse-and-wagon majority.



Loading and Unloading

Terpstra loading up at his farm, fifty miles from market. Five hours later getting the best prices in Chicago



Novel Austrian Transport Train

A transport automobile with wheels made to fit the rails of the Carpathian railway, so that they can be used for bringing up supplies. The big truck in the picture is capable of hauling five or six heavily laden cars.

CANADIAN STREET CARS REDUCE FARES

Because of the competition of the jitney 'buses, reports Consul General R. E. Mansfield, the British Columbia Electric Railway, which operates the city and suburban lines in Vancouver and Victoria, has reduced its rates from 5-cent fares on transfers to 3⅛ cents, or eight tickets for a quarter, without transfers.

Superior Motor Specialty Company, maker of the Su-Dig series spark plugs, 44 N. 4th Street, Philadelphia, Pa., has moved to 30 Irving Place, New York City.

Adams-Bagnall Electric Company, Cleveland, Ohio, has moved its New York City office to 30 Church Street from 40 Wall Street, and its Chicago office to the Fisher Building, from 417 S. Dearborn Street.

Mondex Shock Preventer Company, New York, has sold its entire stock and assets to the Puritan Machine Company, of Detroit. Dealers and owners will hereafter be supplied from Detroit. The Ohio Motor Car Company, of Carthage, has also been taken over by this concern.

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

How Some Western New York Farmers and Produce Merchants Use Trucks

Truck Quadruples Business. Better Prices Can be Obtained as the Result of Using Commercial Cars

By GEORGE W. GRUPP

THE motor trucks owned by the produce merchants and brokers of Buffalo are used primarily to make quick deliveries to the retail and jobbing trade. Some of the merchants have regular routes which they cover each day. For example, the retail grocer telephones his order to the merchant, and he in turn delivers the goods that morning when making the regular trade route. This, of course, is a great saving to the retail grocer, not only from a financial point of view, but also the time spent in going and returning from the local commission houses and his store. Most of the dealers make two trips each morning, the first delivery leaving the commission house at 6.30 a.m. and the second at 10 a.m. All of which, most of the merchants claim, would necessitate the owning of four teams to cover the same ground and deliver the same amount of goods in the same time as they are now able to do with a single truck. "Besides being swifter and better," said one of the commission house dealers, "the truck has actually brought business to me four times as fast as it would grow under ordinary conditions. It seems that people like to do business with a man who owns a motor truck."

Leon Brothers, Inc.

Frank Leon, treasurer of the Leon Brothers, Inc., produce merchants, delivering to the jobbing trade only, said that it cost them $6.50 a day, or $39 a week, in the commission house door and to this cluding the driver's wages, to run their two-ton G. V. 33⅓ miles a day, or 200 miles a week; or, in other words, it is costing them $.194 per mile. For operating, storing, charging, etc., less the driver's wages, it cost them $.12 a mile. "The operating expense of our truck," he said, "we find to be a saving of 7 per cent. over the cost of operating a horse-driven vehicle."

M. & S. Produce Company

The M. & S. Produce Company, which operates two one and a half ton Grabowsky trucks, tabulate their daily cost of operating each truck per 25 miles as follows:

Driver's wages	$3.00
Garage rent	.20
Gasoline	.75
Oil	.15
Tires	.75
Repairs	.25
Depreciation	1.65
Total	$6.75 per day

Or $.27 per mile.

In comparing these figures with the horse, they say it would take four horse-driven vehicles to do the same work as is now being performed by a single truck. Figuring the wages of four drivers alone would amount to $6 per day. Assuming that it costs $5 per day as the entire cost of upkeep for each horse conveyance, would mean an operating expense of $20 a day to do the same work which is now being done for $6.75 with a motor truck.

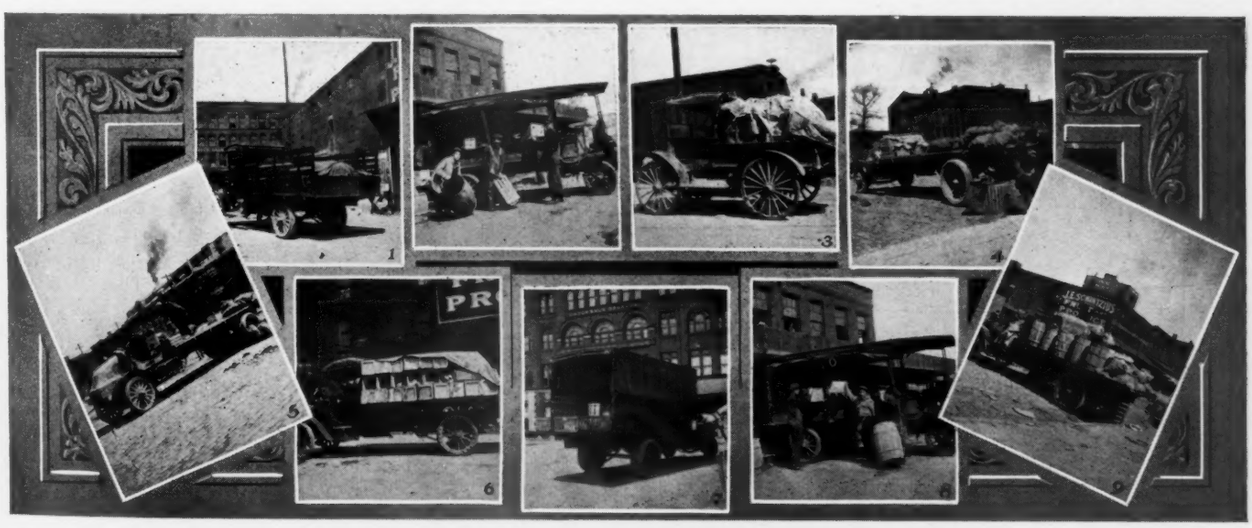
Every farmer interviewed by the writer who owned a truck was a motor truck booster. Everywhere expressions of saving time, money, etc., was heard. Some of the farmers claim they are now able to make two deliveries a day to the local markets, while others continue to make only one. Farmers in the southern extremity of Erie County, also those living in Niagara and Orleans counties, and from Canada, who formerly shipped their goods by railroad, now use the motor truck because they consider it as better, quicker and cheaper than the railroad or the horse conveyance ever was.

W. R. Curtiss & Company

W. R. Curtiss & Company, of Ransomville, N. Y., who raise and market 200,000 ducks and chickens annually, International truck users, claim that they make a daily trip to Buffalo, distance 30 miles one way, with little trouble and expenses; also that they consider it a very profitable investment.

O. Annibaldi

O. Annibaldi, of Port Colburne, Ontario, Canada, told the writer that he makes his round trip to Buffalo, a distance of 50 miles, on his International with produce over sandy roads at a cost of $.65 per round trip, or $.13 per mile. (This, of course, does not include depreciation, etc.) The time consumed in making this round trip is 3 to 3¼ hours, a feat which cannot be done with steam roads. The railroads could not make such round trip and deliver to



Trucks in Use by Farmers and Produce Merchants

1. E. C. Falk, of Brant, N. Y., distance twenty-seven miles from Buffalo, swinging around the corner at the Elk Street Market, Buffalo, to deliver a load of potatoes to the commission houses. He uses a one and a half ton Federal and it costs him $1.25 for gasoline and oil to make the round trip (54 miles). 2. M. & S. Produce Company's (Buffalo, N. Y.) two and a half ton Grabowsky truck being loaded at their commission house. 3. O. Annibaldi, of Port Colburne, Ontario, Canada, with his load of produce on his little International. 4. F. J. Schultz's (North Collins, N. Y.) four-ton Kelly-Springfield truck. 5. F. J. Schultz's (North Collins, N. Y.) four-ton Kelly-Springfield at his Buffalo market stand. 6. Henry Warning, of Orchard Park, N. Y., leaving Buffalo markets for his farm, with a load of boxes (empty). One and a half ton Federal. 7. Motor truck leaving the local markets, with poultry, produce, etc. 8. M. & S. Produce Company's (Buffalo, N. Y.) two and a half ton Grabowsky truck being loaded. 9. William Lemke, Ebenezer, N. Y., with his one and a half ton Federal, at his usual stand.

The CCJ leads in circulation, advertising and prestige

farmer's house in that time and for the same cost.

F. J. Schultz

F. J. Schultz, a farmer of North Collins, N. Y., who owns a one- and four-ton Kelly-Springfield truck and who makes daily trips to Buffalo, itemizes his cost of operating, etc., on his four-ton truck as follows:

Operating Charges

Tires	$.02
Gasoline	.1166
Oil	.0084
Depreciation	.10
Per mile	$.2450

Conditions

Fifty miles per day.
Loads 6 tons on a four-ton truck.
Costs $12.25 to operate per day.

It takes him 4 hours to make the round trip of 50 miles, in comparison with 12 hours with his horse-driven vehicles. Leaving his farm at 2 a.m., he arrives at the local markets at 4. By 10 he has usually sold all his goods, so that he can start for home and be there again by noon of the same day. This is impossible with a horse-driven vehicle because, according to his statements, it would require 2 days of time, or 48 hours, to do what he is now able to do in 10 hours. With the horse conveyance it necessitates his staying over night because of the severe test to which the horses are put up to do on a distance of this kind over a very hilly country. During the berry season Mr. Schultz is now able to make two trips a day.

Comparing his cost of delivery of a smaller quantity of goods to the local markets with teams he figures it as follows:

Horse and wagon $5 a day	$10.00
Livery expenses	1.50
Shoes	1.20
His own time $3 a day	6.00
Total cost per trip	$18.70

From this it can be seen that he not only saved $5.45 in operating expenses, but also 1½ days' time and an increased carrying capacity. His one-ton truck, he claims, costs him about 2 per cent. less to operate than the four-ton.

Commercial Cars Handling Farm Produce Around Kansas City

By W. D. MENG

THE roads leading into Kansas City are no longer deep ruts in soft earth, but well macadamized boulevards or smoothly dragged and packed dirt roads. This has enabled the farmers and gardeners in the adjacent territory to adopt the automobile and commercial car. And it seems that, in a short time, the bulk of Kansas City's "home grown" food supplies will be carried to the city's stores and markets; and even direct to the consumer, by commercial cars.

Time Saved, the Big Advantage

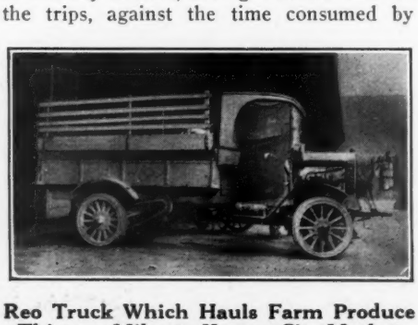
"I do not see how I could get along without my truck," said H. A. Ackerman, a gardener, located about 8 miles out from the central market. Mr. Ackerman, like a majority of the gardeners, has a light machine, although it has sufficient power behind it to carry a good load and attain respectable speed. His is a Willys Utility 30. "I get to market with my product without any fooling. I do not have to get out in the middle of the night to let my horses eat before hitching up for the slow ride to the city, I usually make the trip in about 30 minutes, passing the farmers and gardeners who have been putting in a good part of the night on the trip, and I have my stuff fresh and ready when the market opens."

Quite a few farmers and gardeners, who use their horses in the fields and gardens, are not buying motor trucks, preferring to use the horses to draw their products to market. Horseflesh, however, has become so valuable in the Middle West that the prudent man does not feel like working his horses in the fields all day and then driving them a good part of the night into town with a load of "truck," without giving them sufficient rest.

H. T. Corson, who runs a model dairy at Bethel, 10 miles out of Kansas City, Kas., has two fine trucks that spin into the city every morning with supplies of milk for delivery to his customers at their homes. Another large dairy farm east of Kansas City uses trucks to carry milk to its city patrons. Down at the city market, a big Reo truck carries 2 tons of garden products to commission firms from the Sauber Farm, near Independence.

A Koehler one-ton truck is perhaps the most important factor in the business of the Dreyer family, Turner, Kans., and Kansas City, Mo. F. W. Dreyer is a farmer at Turner, 8 miles from Kansas City. A. F. Dreyer, a son, is in the commission business at the city market. Another son drives the Koehler truck. He brings a load in every morning, making the 8 miles in about 45 minutes, against the 2 hours which it used to take him with the horses and wagon. In the summertime he now starts from home about 4 o'clock, whereas he used to start about midnight. There are rock roads all the way. The truck carries from a ton to 3000 lbs., and is very valuable in carrying merchandise back to the farm for Mr. Dreyer and the neighbors.

W. L. Pattison, of Merriam, Kans., about 8 miles from Kansas City, has a Reo and a Gleason truck of about 1500 lbs. capacity. The Reo he uses daily to bring vegetables to the city market, saving 4 hours' time in the trips, against the time consumed by horse and wagon. He has sold his horses and has his plowing done. The predominantly important advantage of the truck is the saving of time. In his estimates of the cost, he says that the total expense of the truck is perhaps about equal to the total cost of horses and wagons, including loss of horses, but that the 4 hours a day makes the big difference in the utility of the truck.



Reo Truck Which Hauls Farm Produce Thirteen Miles to Kansas City Market and Distributes to Seventy Stores

Truck Saves $1000 a Year

A. M. Sourdry, who has a farm 13 miles from Kansas City, has for a year run a large Reo truck, covering about 50 miles a day. He makes the trip to town in 1½ hours and, in the course of the morning, visits 70 stores, where he sells his produce. The truck replaces in this service three teams, which it had been his custom to alternate in the city delivery. He had been accustomed to sell one team each year, at half price, to replace with fresh horses at $250 a team. The truck will hold, as an instance, 240 baskets of tomatoes, against 100 that the wagon would carry, which, at $1.25 per basket, means $300 from tomatoes on a single trip, against $125 which he could make with his horse-drawn wagon. Mr. Sourdry estimates his gain in income and saving in expense through the truck at $1000 a year. He operates the truck himself, hiring men to do the farm work and prepare the loads for delivery.

The illustration shows well one of the big advantages to the economic handling of produce which will come from the motor truck—the saving of space in the markets. The horse's nose extends more than 1 ft. beyond the truck—and the horse's wagon is backed against the curb, while the auto is not backed so far. At the city market, the horses are often removed from the traces, to save space, and hooked up again when a move is necessary.

Distributing Companies Instead of Markets

There is a tendency, although still only a tendency, of firms handling farmers' goods direct to the consumers. This is exemplified in the activities of the Producers' Distributing Company, 721 Walnut Street, Kansas City, Mo. Farmers bring or send their stuff to the headquarters, and the company distributes over town or dispatches the produce by Parcel Post. The company takes a commission of 15 per cent. on the goods sold. It charges 10 per cent. on the value of the purchase for delivering, consequently most of the purchases, indeed more than 90 per cent., are carried away from the store. This company, therefore, is discouraging local distribution to those who prefer to pay the lowest prices for their produce, and is encouraging the bringing of farm produce directly to the distributing center by the farmers. So far, the plan has not made tremendous headway, since farmers in the neighborhood

The CCJ has most advertisers because it gives them biggest returns

can with difficulty be weaned away from their practice of dealing with commission merchants at the city market. But this summer the Producers' Company will institute a new order of things, which will undoubtedly make a tremendous difference in the plan of operation and will result in farmers bringing their goods direct to the company. This new plan involves the establishment of branch stations and a receiving station probably in the suburbs, to which the farmers can bring their produce. Jackson County has many miles of rock roads, and if the farmer can bring his stuff to the edge of the town and hike back, consuming perhaps less than an hour in the operation and saving 4 or 5 miles' travel each way within the city limits, he undoubtedly will be the more attracted by the Producers' plan. The activities of this company, in connection with other phases of the situation, such as the encouragement of the local associations and the tremendously economical use of motor trucks by some farmers now having them, and the vast extent of rock roads, may mean big things for the commercial car in food delivery from the farmer within the next 12 months.

Produce Delivery Systems

When nearly every tenth person in Kansas City had equipped himself with an automobile of some sort, the particularly energetic and progressive dealers of the vicinity began to concoct schemes to get rid of the used cars that were now coming into the market. They were not long in discovering a large and productive field in Jackson County. There they found that great crops of vegetables and other truck farm produce were being raised annually and drawn to town by superannuated teams. The gardeners were in a perpetual bad humor, on account of the length of time which it took to market their perishable goods. The dealers began to reflect, and thus the produce delivery system was inaugurated.

At first the idea did not take with the farmers. The trucks introduced were much too small for the big producers. But the service was quick enough to suit the most conservative farmer on the experimental routes outlined by the transportation companies. This was encouraging.

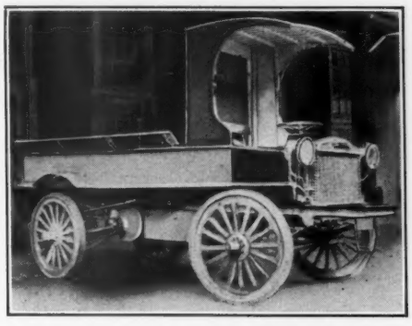
Several of the smaller garages and motor car dealers and two automobile schools ventured out with trucks of several tons' burden and had wonderful success. Now every country road within a radius of about 25 miles of the city market is teeming with both light and heavy vehicles charging a popular price for delivery.

"The produce delivery was one of the best ideas ever developed here," E. E. Peake, secretary of the Kansas City Motor Car Dealers' Association, said, in reviewing the year's growth in motor car sales, a few weeks ago. "It is easier now than ever before to get fresh vegetables and milk, and men, who never thought of entering into competition with farmers owning teams, are renting garden plots. In fact, the farmer who drives to town behind Dobbin now is regarded by his more progressive neighbors as a sort of has-been."

The used cars, of course, were the pioneers in the produce delivery service. Up to about a year ago, they were used almost exclusively; but now big money is building proportionately big cars for an ever increasing trade. The rate of hauling has been reduced to a minimum and it has been found that one speedy truck can deliver a load to consumers scattered over a wide district much quicker than a horse team in the old days could take it to one distributing center.

Converted Pleasure Cars

The Sweeney Transportation Company was one of the first of the several hundred automobile concerns to see in the light roadsters, as well as in the heavy truck, the possibility of bringing the farmer, who



Koehler Truck

Hauls produce from the Dreyer farm, Turner, Kansas, to the Dreyer commission office, Kansas City. It is also used in city work during the day.

lives not more than 25 miles from the market, and his patrons almost within the same neighborhood, so far as quick delivery is concerned.

A number of cars of various makes were converted into produce wagons a few years ago and sent out on a scouting expedition, spreading the gospel of quick service. The milk men were among the first to see the point, but they purchased cars of their own, instead of patronizing the Sweeney concern. This was not satisfactory to the experimenting transportation company. The truck gardeners were next sounded. Yes, they long had been looking for somebody to make just that kind of a suggestion to them. But small converted roadsters would hardly handle their produce during certain seasons. There was the potato crop, for example. The potato market fluctuates the same as cereals. When it fluctuates to a point where Mr. Gardener can see a profit in disposing of his entire supply, he wants the crop moved without unnecessary delay to the market.

Trailers Also Used

Therefore, this and other transportation companies, which broke into the game early, began to buy some large trucks and, sometimes, a tractor and several serviceable trailers. Last fall, when the truck gardeners were disposing of their heaviest crops, the small gardener saw his products hustled over the country roads cityward and the big planter found trailers the size of box cars waiting to do his heavy hauling with equal facility.

"In this way," Estil Scott, president of the Kansas City Motor Car Dealers' Association, said recently, "Not only was the truck gardener well served at all seasons, but some of the farmers who kept less than a dozen cows found a means of getting their products to the consumer without being obliged to sell at a reduced price to the local dairyman. And city dwellers, who had friends living on the farm, grasped the opportunity to get undiluted milk, butter and eggs."

Some of the extensive farmers now have their own auto delivery systems. R. A. Long, the lumberman who has a vast farm near Lee's Summitt, about 25 miles from Kansas City, keeps many large trucks, so constructed as to be absolutely sanitary, and, on the strength of the high class milk thus insured, sells the entire product of his dairy for $.05 more a quart than what other brands are sold at the corner grocery. There are now upwards of 500 produce delivery wagons operating in and about the city, and the prospects are that this number will be nearly doubled during the current year.

Three-Ton White Used by Henry Muhs Company, of Paterson, N. J.

The CCJ has most readers because it gives most information

The Farmer and the Commercial Car

Truck Manufacturers Should Educate the Farmer. Trucks Eliminate the Middleman's Profits

By CHARLES H. SPENCER

THE manufacturer of commercial cars has realized for some time that the farmer is a good prospect. His demands stand out prominently; they are right on the surface without delving into a finer analysis, such as selling to the city merchants often requires. The farmer is isolated, cut off from easy communication with the city, except for the telephone and the slow-going horse-drawn farm vehicle. He needs the prompt service that the motor truck gives, and the motor truck manufacturer, who contrives a campaign that will segregate the wheat from the chaff in the farmer prospects, will reap a rich reward.

Nobody Taking the Lead

When you talk with the motor truck manufacturer about the value of getting business from the farmer, he says, "Yes, it is true the farmer holds great possibilities as one of the biggest buying factors of any business line that we can approach—but, how can we get at him? How can we reach the farmer who will buy our product? In the city our list of prospects is easily compiled, they all lie within easy reach of our salesmen, their names are under classified lists in the telephone directory; while the farmer prospects are widely scattered, he needs to be educated to appreciate the type of car we sell, and the process is long and expensive." The attitude assumed by the manufacturer is to let the other fellow try it out, do the missionary work, and, when a program is devised, it will be time enough to go after this rich field in selling the commercial car.

Farmers Lack Proper Transportation Facilities

Commercialized farming has become an American industry. The farmer has realized the importance of putting his acreage on a commercial basis, and is beginning to gain greater profits than ever before, through extended schemes and judiciously planned intensive farming. Aside from the knowledge of regulating the kind and the importance of sowing certain seeds at certain periods in soils chemically known and analyzed, he now appreciates the fact that his burden of growing crops is only one item of contention. Like the manufacturer, he must sell and deliver. Naturally, he is in quest of a market where the largest profit may be realized, and, if his farm is located within a radius of 50 to 75 miles from a large city, his opportunities are largely increased for placing his produce in a profitable market, where highest prices prevail. The lack of economical transportation facilities is the one big handicap. The profits he should receive are diverted into the channels of freight or express charges.

The farmer is a bigger man than he realizes himself to be, but, like the chain, is only as strong as the weakest link. The one weak link is transportation facilities from farm to markets. The farmers, as a class, are not experimenters. They are hard-headed buyers and require considerable persuasion to invest in devices that might be helpful, but, like sheep, when one heads in a certain direction, they are willing followers. This is indicated by the way they purchase the machinery equipment required on the farms. It becomes comparatively easy to sell an article in a community after one of the neighbors makes an investment.

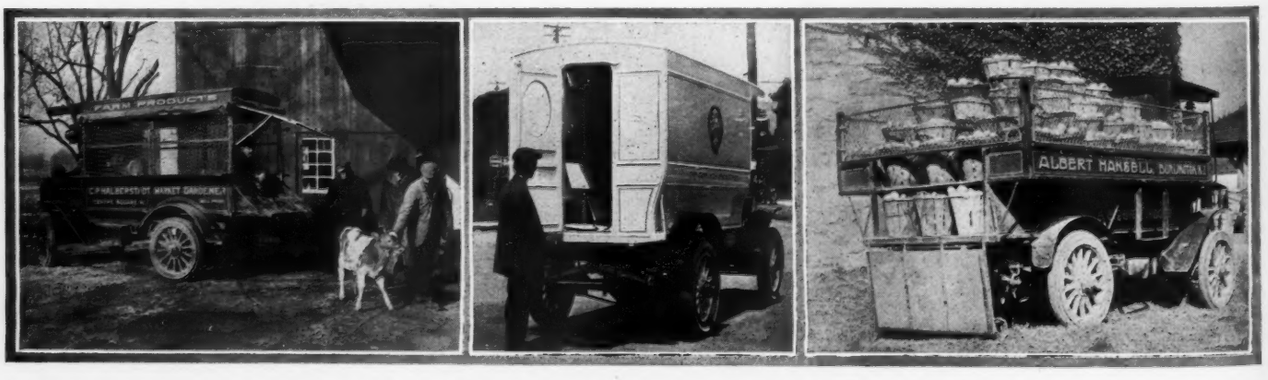
As we approach the problem to devise a campaign for securing the farmers' interest in the motor truck, we find that the fruit grower, dairyman and produce raiser, who are specialized farmers, are the class that hold out the best possibilities. Each class has need of a different type of car, either in carrying capacity or in style of body adapted to the individual use. The majority of farmers in these fields know that a larger capacity truck—say from 2 to 5 tons—would fulfill their broadest requirements; yet some of them have purchased smaller trucks, which will not give them the satisfactory results that the bigger car affords.

Co-operative Hauling Predicted Impracticable

Not long since the writer was given an opportunity of listening to a very prominent statistician discourse on the use of the motor truck in the farm field. He claimed that the commercial car had the power to release the city inhabitant from the bondage of the high cost of living, by providing a transportation service from the farm to the city buyer of the food necessities of life. He suggested a co-operative system of establishing a large hauling organization that would open up the avenues of trade, and form arteries of the country highways leading to all large cities, where shipments of farm produce right out of the ground could be piled into a commercial car and brought to the ultimate consumer in the city.

With the rapid development of our roads, there could be established a co-operative scheme which would allow market stuff to be delivered in our cities costing one-half the present high prices. In talking with the editor of a farm journal, which reaches the largest circulation of any farm paper in the country, he was of the opinion that the co-operative scheme, if left to the farmer to create, would result in a veritable failure. One farmer would become jealous of the load carried from a neighbor's farm and dissatisfaction would soon spring up in various ways that would make a co-operative plan inconsistent.

The spring season opens up great possibilities in assigning salesmen to territory in outlying districts around large cities and supplying them with a car with which to make personal calls on the farmers in a given neighborhood. Mailing lists of fruit growers in a specified territory can be secured from farm journals, as also can the lists of dairymen and produce growers. A series of interesting circulars on the value of the commercial car you are offering, with some approximate costs, will add another angle to the proposition of starting the farmer to consider your type of truck for his particular use.



Autocar Used by Farmers and Dairymen. Note the Body Constructions

The center illustration shows a body designed for retail delivery of milk and cream, and contains a series of lockers located on either side of the car, divided in size to take quart and pint bottles

The CCJ brings greatest returns to advertisers because of largest circulation among quantity buyers

Reducing Handling Gets Better Prices For Fruits

Small fruits suffer much in the handling. First they have to be packed, then crated, put into a wagon that carries them to a railroad station, lifted to the platform, where they are put into the train, then banged around on the train, lifted from the train to the station platform, loaded into a wagon and driven to the terminus, where once more they have to be taken out and moved into the store or place where they are exposed for sale. It can readily be understood that with all these operations it is possible to seriously damage farm products in transportation, and it is, therefore, apparent that there is big value in a system of transportation that reduces this handling to a minimum.

Commercial Car Eliminates Middleman

Another item of serious consideration is the fact that the motor vehicle always means, to a large extent, the elimination of the middleman and a consequent increase of profit to the farmer. This situation is not without its strong benefit to the public, and provides pure and better food at a reduced cost to all concerned.

Good Examples of Truck's Advantages

Following are interviews with farmers, showing how quickly the motor truck proves its value in farm service:

When the writer went to call on C. P. Halberstadt, a truck farmer of Center Square, Pa., the first week of January, 1915, he was out on a trip for a neighbor, collecting thoroughbred calves, which indicates immediately that a produce specialist has other uses for his truck than hauling produce to the market in the summertime.

Mr. Halberstadt keeps his truck moving both summer and winter, and he says—"Why shouldn't I keep my car moving? It is always ready to go and has never refused me yet. I am a truck farmer and my busy season is in the summer, but, instead of storing my car for the winter, I keep it going during all the winter season, hauling calves, cows, baskets, and any material my neighbors want to send any distance away.

"Since the hoof and mouth disease all farmers' stock has been quarantined, and only lately have they permitted in this district the transferring of stock from place to place. I brought those five thoroughbred calves 15 miles over the road this morning in my truck, and have delivered them and am back again at my farm house before dinner, ready for the next job this afternoon. Of course, with horses this work could never have been done under a day's time.

"The other morning I hauled a cow in my car for a farmer near Norristown. This job would have taken more than a day with horses. So far as horses are concerned, I do not use them any more, but have a four-passenger car for light duty and my heavy truck to do my farm work with. I have only 20 acres of ground, all of it good tillable soil, and, after I rent my plowing done from neighbors, I use my big truck for general hauling purposes. When the harvest season arrives, I haul what I raise on my place, to the most profitable markets, sometimes 30 miles away. My motor truck easily pays for itself in the extra prices I can get by taking my produce to the markets that pay. I hauled to Philadelphia last summer, 18 miles away, nearly all of my produce. In one day I made three round trips, and this kind of service is what counts. I also hauled in the summer of 1914 5000 baskets of peaches for neighbors to a good paying market at distant points. I sometimes buy outside produce and fruit, and, with my motor truck, make more profit on the material sold than the farmers I buy of can make by using their horse-drawn vehicles. In fact, there are various ways in which my truck will make money for me. I took a moving last spring to a place above Norristown, 32 miles away, and got back the same night and the road conditions were none too good in some places."

When asked how much this car cost in repairs, Mr. Halberstadt said, "So far, the car hasn't cost me a cent outside of oil and gasoline. I use solid tires, and, while I don't keep track of the miles I run, these tires don't show the slightest sign of wear yet, and they have been on the car 10 months. I carry a liability insurance costing $48 per year, which includes accidents to the extent of $10,000."

The Middletown Farm, of Middletown, Del., makes the following comments regarding their one and a half ton motor truck: "We have run our car steadily since October, 1910, averaging 75 miles per day. It has needed but few repairs and has given first-class service. We used to ship our milk and cream to Wilmington, 25 miles away, by train. Now we do it with our car, making one or two round trips every day, carrying 1½ tons each trip. Our car has been a sound investment in every way."

A New Jersey fruit grower, Albert Hansell, of Burlington, says: "I bought my commercial car because I became convinced that hauling fruit to market with horses and wagons was too expensive. After several years of service I know now that I was right. My car makes three trips to Dock Street, Philadelphia, 15 miles distant, in a day, while a team of horses is making one trip. The horses after such a trip have to be rested up the next day. My car often makes three trips to Trenton and back in a day, a total distance of 120 miles. I bought my car in 1911, and it has averaged about 1200 miles a year in that time, and has not had a serious breakdown, and has added greatly to my profits, through a quick marketing of my farm products."

Many other farmers, whom the writer has interviewed, make about the same comments on the service their motor trucks are giving.

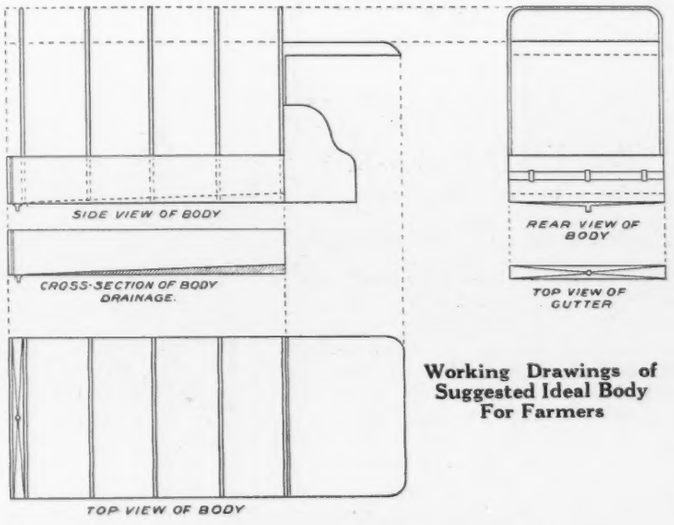
It is high time for the manufacturer of motor trucks to realize that in selling motor trucks to the farmer he is benefiting not only himself, but humanity—through the triple alliance of manufacturer, farmer, and city dweller or ultimate consumer.

A POSSIBLE IDEAL BODY FOR FARMERS

As to the style of body best adapted to the needs of the farmer much difference of opinion seems to exist. But possibly the nearest to the ideal body which would suit more conditions and needs according to the writer's notions, after interviewing a large number of farmers would be a body constructed in the following manner.

It should be of steel construction with a slight fall in the bottom slanting toward the rear for washing and drainage purposes with a sort of gutter and pipe to carry off the water and other liquid fluids which are apt to be found in a farm wagon. The sides or walls of the body should also be of steel construction, and say, 15 or more inches high, and equipped so that stakes may be affixed. It ought also be provided with some sort of awning stanchions so that a canvas could be placed over the entire truck when raining or when traveling in the hot sun. This canvas top or cover ought to be of such construction that it may be easily rolled up or unrolled.

The advantages of a body of this construction are these: First, it can be used to carry produce to the market under cover. Second, if the farmer chooses to carry a load of manure back with him he may do so. When the body is emptied of its load it can be more easily cleaned and drained.



Working Drawings of Suggested Ideal Body For Farmers

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

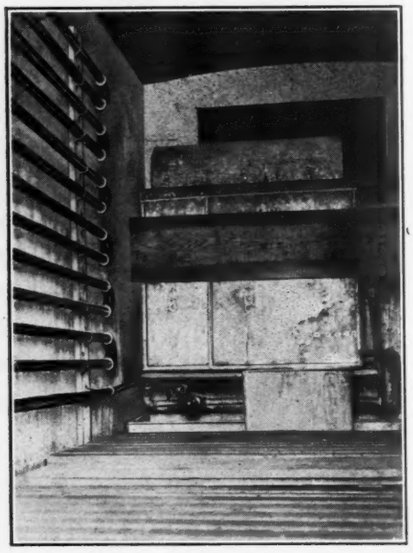
Trucks Increasing in Importance in Chicago Food-Supply Problem

Refrigerator Trucks to Connect Central Produce Terminal With All Parts of the City

By WALTER A. BIRMINGHAM

INCREASING in numbers, actually, day by day, motor trucks have become very much a factor in solving the food supply problem for Chicago. Among the commission, produce, provision, and other food products interests, distributed from South Water Street, the main wholesale market, motor trucks are very much in evidence, if for no other reason than their large carrying capacity compared with the small space they occupy backed to the curb on this narrow street. As this market is without railroad facilities and in the past was wholly dependent on the horse for transportation, the motor truck is practically demonstrating to a large number of future motor truck owners its great advantage for rapid and economical operation.

Among numerous motor truck owners interviewed in the South Water Street group each one is satisfied with his investment in motor power, although here and there a motor truck owner complains of insufficient business to keep his engines always busy, and then he admits the power vehicle is replacing three or four teams.



Interior of Refrigerator Body
Showing pipes which line inside of body. Refrigerator machine operated by truck engine

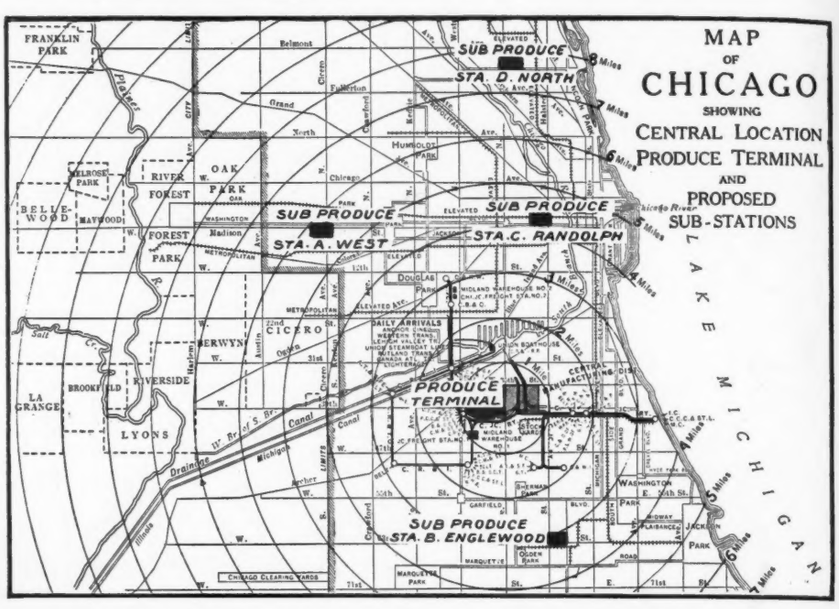
Produce Terminal and Refrigerator Trucks

The new Produce Terminal Corporation, which plans to build a new $20,000,000 food handling terminal in Chicago, to supplement, and, eventually, to replace South Water Street, has been experimenting with three- and six-ton refrigerated motor trucks which are nothing less than cold storage plants on wheels. In the past a long haul in the open with consequent exposure to the sun has done enormous damage to perishable fruits and vegetables, and, in casting about for a means to eliminate this loss, the Produce Terminal Corporation of Chicago began to consider these aforesaid gasoline-propelled iceboxes. Refrigerating mechanism is connected with the motor of the truck and from this mechanism runs the pipe of an ammonia refrigerating system which almost completely lines the body of the truck. The latter is insulated to keep the temperature within it at a uniform point.

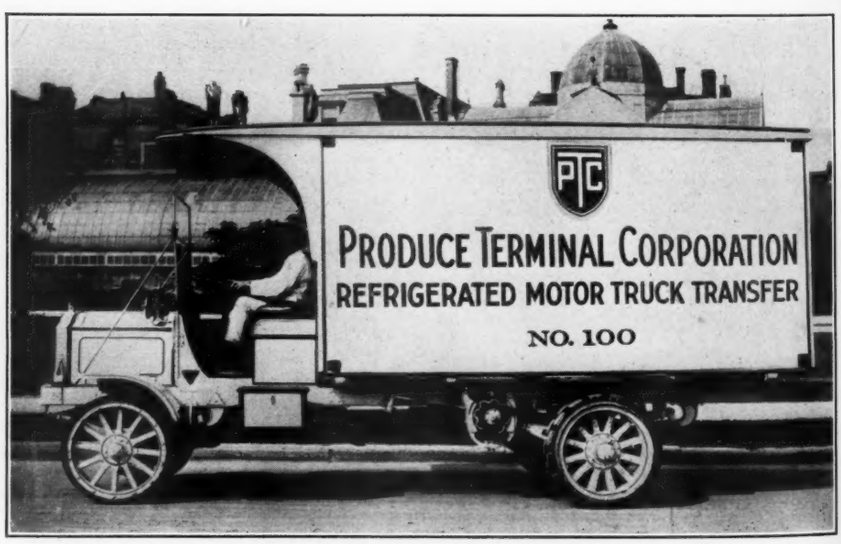
These refrigerated trucks will also render a service to the grocer of Chicago in that they eliminate the necessity of coming to the terminal for goods.

An estimate of the speed with which the big trucks operate can be made from the following report by the Produce Terminal Corporation on three-ton Packard truck with a three-ton load covering the following distances from Thirty-ninth Street and Ashland Avenue:

To Dearborn and South Water Streets, 37 minutes; to Ninety-second and Commercial Avenue (South Chicago), 58 minutes; to Main Street and Chicago Avenue (Evanston), 1 hour and 23 minutes; to



Map Showing Central Produce Terminal and Proposed Substations



Refrigerator Truck Used by Produce Terminal Corporation

The CCJ leads in circulation, advertising and prestige

111th Street and Michigan Avenue, (Roseland), 1 hour and 12 minutes; to Randolph and Halsted Streets, 28 minutes; and to Harlem Avenue and Lake Street (Oak Park), 1 hour and 8 minutes.

First Motor Truck in Hire

The Motor Truck Transportation Company, with a fleet of thirty-two motor trucks, viz.: Five seven-ton, five five-ton and six two-ton Old Reliable, one four-ton and two two-ton De Kalb, one three-ton Juno and twelve one-ton Knox. This corporation claims to have placed in service the first motor truck in the world for hire —a one-ton Knox—10 years ago. Constantly in commission during that decade, the truck has recently been overhauled and repainted and now has the appearance of a new vehicle, and the original motor is still working. Fifteen of this company's motor trucks are used exclusively for food transportation for the Chicago market.

Costs Per Ton Mile

In the experiments various runs were made to different parts of the city from the location of the produce terminal, and the following records were made. Five different runs are cited to give typical examples of cost:

Date	3-10-15	3-11-15	3-12-15	3-13-15	3-15-15
Weight loaded	7.375 tons	7.375 tons	7.375 tons	7.375 tons	7.375 tons
Weight empty	4.15 tons	4.15 tons	4.15 tons	4.15 tons	4.15 tons
Distance run loaded	48 miles	44.5 miles	17.5 miles	7.5 miles	22.5 miles
Distance run empty	48 miles	44.5 miles	17.5 miles	7.5 miles	22.5 miles
Total mileage	96 miles	89 miles	35 miles	15 miles	45 miles
Total cost	$14.372	$13.814	$8.51	$3.65	$13.789
Cost per ton mile	.0259	.0269	.0421	.0242	.0242

Provision Company, After Long Use of Truck, Finds Figures Low for Work Done

THE Cleveland Provision Company, the largest packing house in the State of Ohio, has partly motorized its delivery system, employing a fleet of seven White trucks on city and suburban routes with good results in spite of conditions that are in some ways unfavorable. This equipment, although hauling only a small part of the company's total tonnage, has clearly established the superiority of motor trucks in the particular work they are now doing, and also has shown certain advantages which cannot be realized with horses.

Chief among them is the advantage of getting the shipments out early, making long haul deliveries direct from the plant to the customer and making daily deliveries to outlying points. In connection with this interurban work it is interesting to note that the long running radius of the motor truck was one of several factors enabling the company to close its Lorain branch and deliver direct from the plant in Cleveland.

Deliveries to the outlying points are made in winter as well as in summer. During the worst of the winter storms of the last two years, when the snow was as deep as 12 inches, the trucks maintained their regular schedules and not a day was lost.

An officer of the company stated that there is not much difference between the cost of delivering meat with trucks and with horses, but that motor trucks are much more desirable. The company's records for a period of 6 months show that six machines, operating under varying conditions, hauled 87,835 ton-miles at an average cost of $.096 per ton-mile. This figure not only indicates efficient truck service but, considering that horse costs are approximately the same, shows an unusually high standard of horse hauling efficiency against which the trucks are competing.

The horses are used to make nearby deliveries, and if they were required to deliver to the same points where the trucks deliver in the city the cost of horse hauling would be higher.

The advantage of making deliveries direct to the customer reduces part of the hauling that would be necessary and the shrinkage that would occur if shipment were made either by express or by relay from a local depot.

The company's plant is centrally located at Canal Road and the junction of the Baltimore and Ohio railroad tracks. The motor trucks are housed in a combined stable and garage only a short distance from the plant, so there is practically no loss of time or unproductive expense in running from the garage to the loading platform.

When the company maintained a branch in Lorain, all deliveries for that territory were shipped to the branch by rail and then delivered by horse and wagon. Goods that were shipped from Cleveland on a Monday would be unloaded at Lorain on Tuesday and the entire shipment would be hauled to the branch. In distributing this meat to customers' stores by horse and wagon 3 days would be required. During those 3 days there would be a natural shrinkage and depreciation in condition.

Under the present plan of direct delivery, the goods are packed after 12 o'clock midnight and delivered the same day, saving the shrinkage and giving the customers meats that are absolutely fresh from the packing house. The truck covering these western routes averages 71 miles daily as compared with a 45-mile average for the Painesville-City truck. Each of the machines engaged solely in city work averages a trifle under 30 miles a day.

The accompanying table shows the work done by four trucks during a period of 6 months and two trucks which had been in service a shorter period.

It will be noted that there is a big difference between the daily mileage and tonnage of the truck that covers the Lorain and Elyria routes and that of the two city beef trucks; also a difference in the daily operating cost, yet when this cost is reduced to a ton-mile basis, the figures are just about the same for these three three-ton trucks—$.073, $.075 and $.071 per ton-mile.

The explanation lies in the fact that, in the case of the two city trucks, the failure to take full advantage of the running radius is made up by the high tonnage, while in the case of the Lorain-Elyria truck the high mileage compensates for the inability to take full advantage of the load capacity. In the case of three-ton truck No. 8, the cost per day is moderate, but the cost per ton-mile is high on account of the fact that the truck seldom carried more than half a load and the average mileage was also low.

The quick replacement of parts, adopted by the company, reduces the time that a truck is laid up, but the cost is often higher than it would otherwise be, but the company knows the exact cost of having each truck idle, as well as the cost of keeping it busy, and the reduction of idle time under this policy more than balances the increased cost.

"We ask more of these trucks than we should ask," said an officer of the company. "The figures include the cost of several expensive repair jobs which were due to accidents and abuse by drivers."

	Collingwood No. 3 1½-ton	Painesville and City No. 4 1½-ton	City No. 5 3-ton	Lorain and Elyria No. 6 3-ton	City No. 7 3-ton	City No. 8 3-ton
Work Performed:						
Period covered	6 months	6 months	6 months	6 months	5 months	3 months
Number of days used	152	144	154	151	121	67
Miles driven	6534	6566	4534	10801	3440	2426
Average miles per day	41.8	45.6	29.4	71.5	28.4	36.2
Tons hauled	201.3	205.7	745.4	414.5	625.6	99.3
Ton-miles	8535	9591	20696	28898	16844	3271
Cost:						
Per day	$9.43	$10.30	$9.89	$14.39	$9.96	$10.15
Per mile	.225	.226	.336	.201	.35	.28
Per ton-mile	.168	.154	.073	.075	.071	.207
Total ton-miles	87,835					
Total cost*	$8,504.69					
Grand Average Cost Per Ton-mile	.096					

*Total cost includes gasoline, oil, grease, tires, repairs, drivers, depreciation, and insurance.

The CCJ has most advertisers because it gives them biggest returns

Activities of the Motor Truck Association of Philadelphia

OFFICERS

E. B. JACKSON, President
EMLEN S. HARE, Vice President
J. D. HOWLEY, Treasurer
W. H. METCALF, Sec'y, 5 N. Twenty-First Street

BOARD OF GOVERNORS

L. J. EASTMAN, R. W. COOK, H. M. COALE, O. E. STOLL, O. J. DOOLITTLE

OFFICIAL ORGAN—COMMERCIAL CAR JOURNAL

The monthly meeting and dinner of the Motor Truck Association of Philadelphia, at the Adelphia Hotel, resolved itself practically into a symposium on "vicious legislation" introduced in the Pennsylvania Legislature which has just closed. While the association was organized for purposes independent of politics, it found itself facing a number of bills which serlously affected the automobile industry.

The Motor Truck Association, in conjunction with the Automobile Trade Association and the Pennsylvania Motors Federation, jumped into the breach and at the last minute was mainly responsible for the defeat of House Bill No. 1471, which provided for the doubling of the automobile license fees in this State. The meeting was presided over by E. B. Jackson, of the Packard Company. Secretary W. H. Metcalf read a report to the association telling of the activities of the association and the work that had been done by the association during the past 5 months.

Judge Eugene C. Bonniwell in an address, treated in a somewhat humorous vein upon the subject of "vicious legislation." He pointed to the fact that there had been introduced in the past Legislature no less than 3600 new bills from all parts of the State, evidently meant by the individual members to impress their constituency at home with an idea of their activity in their behalf without expectation of securing passage of the bills. He showed that the great majority of these bills made provision for contingencies already covered by existing laws. He also pointed out the loose method in which most of these bills are drawn up without regard to accuracy or the necessities of the case.

Mr. Jackson followed this up with a speech tellinig how he, accompanied by E. Douglas Bartlett, counsel for the Automobile Trade Association, and Mr. Robert Hooper and a few others, had gone to Harrisburg to fight the license fee bill. He said that undoubtedly their efforts, backed up by thousands of letters sent to the Senators and Representatives by the automobile public at the instigation of the Motor Truck Association of Philadelphia, the Automobile Trade Association and the Pennsylvania Motorists' Federation, had made impossible the passage of this bill.

"This should be a lesson to us," said Mr. Jackson, "of the necessity of organization. With an army of practically 100,000 automobile and truck owners in this State there is no reason why we could not absolutely sway legislation. It is a public fact that the present license fee raised an excess of $1,000,000 above the cost of policing the act and maintenance of roads in this State this year, and it was planned to transfer this sum to the general funds of the State for other purposes. What fair necessity could therefore exist for the increase of the license fee? Pennsylvania has only 3 per cent. of improved roads, and yet we are paying this enormous sum without getting the benefit of it. There is no reason why the automobile should be so taxed while other methods of transportation remain untaxed. Furthermore, I think we can do great work among the farmers by inducing them to co-operate in the movement for good roads because they really derive the most benefit from the improvement of their property and the increased valuation of same."

Mr. Bartlett indorsed all that Mr. Jackson said, and stated that it behooved the motoring public to unite for its own defense.

Richard Kain gave the association some pertinent advice on political organization on the part of the individual and not as an association in order to secure legislators who would really represent them.

The Motor Truck Association of Philadelphia will hold its annual outing on June 23d at Kugler's Mohican Club House, Morris Junction on the Delaware, N. J. There will be the usual star baseball game and other athletic events, and the usual good time.

GOODYEAR STOCK SYSTEM SAVES TIME

The Goodyear Tire and Rubber Company, Akron, Ohio, has inaugurated a stock system for dealers enabling them to determine in a moment by referring to a small file on the desk or near the telephone just what tires are in stock. The idea, briefly, consists of a set of colored tags, each for a different style of tire. Each tag has a coupon attached. After being properly marked, this coupon is torn off and kept for desk record, while the stub is fastened to the tire in the stockroom. Blank division cards are also supplied so that the dealer can make up his own index for this system.

The Auto Transportation Company has started a 'bus line between Carthage and Jasper, Mo.

The Postoffice Department, Cincinnati, Ohio, has awarded a contract to eighteen mail collectors to allow each collector the sum of $900 yearly for 4 years for the maintenance of motor cars for mail collection. The collectors are to own and operate the cars. Special screen bodies will be supplied. It is figured that the allowance will be sufficient to maintain the cars and also to pay a substantial amount towards the original cost each year.

One of the Fleet of Twenty Internal Gear Driven Republic Trucks of the Pacific Baking Company

This company, of Los Angeles, is just completing its fleet of twenty Republic trucks fitted with Torbensen internal gear rear axles, for bread delivery, not only in Los Angeles, but to neighboring cities distant up to one hundred miles. Four of these trucks were thoroughly tried out in this service before the fleet was completed. Note the rack method of loading, all bread being wrapped dust-proof.

The CCJ has most readers because it gives most information

Solid Truck Tires

RESILIENCY that positively protects the truck mechanism is scientifically combined with toughness that gives the longest wear, in Firestone truck tires. With most-miles-per-dollar service, they add long life to truck motors, axles and frames. And the Firestone

Removable Rim Equipment

insures continuous truck service in any place—enables any truck driver to change tires in a few minutes. Truck layoffs are practically eliminated.

The Firestone equipment is simple and absolutely effective. When tire or rim is applied it is one with the wheel. Proved by years of service under the hardest conditions. The preferred equipment of the largest truck users. The Firestone

Pressed-On Type

also has unmatched resilience with wearing quality. Firestone building makes the steel sub-base, hard rubber base and cushion tread one unit.

There is a Firestone Service Station in every trucking center.

It is the work of a few minutes to apply to any S. A. E. standard wheel one of these strong, durable, pressed-on Firestone tires. They are applied direct to felloe band under 200 tons hydraulic pressure. "Creeping" is not possible.

Call a Firestone man from your local Firestone branch and let him make recommendations to meet the special conditions under which your trucks operate.

Firestone Tire and Rubber Company
"America's Largest Exclusive Tire and Rim Makers"
Akron, Ohio—Branches and Dealers Everywhere

Commercial Cars as Used in Buffalo

A Statistical Review of the Type, Number and Make of Trucks Used Horse-Vehicle Transportation Rapidly Decreasing

By GEORGE W. GRUPP

IN TAKING a census of commercial cars, the writer found that there were 3975 trucks in use in twenty-two counties of the State of New York, the western half thereof. Buffalo claimed 1254, or 33 per cent. of that number. And in this total of 1254 machines, 168 different makes were represented; 10 different styles of bodies were used; 49 different horsepowers were used, and all of which were used in 182 different kinds of businesses.

In the year June 30, 1912-13, there were 9588 horses in use in Buffalo. The year June 30, 1913-14, there were 11,413 horses in use, but from July 1, 1914, to December 13, 1914, only 546 horses were registered. Then the reader must understand that in these totals no deductions have been made for horses used for pleasure purposes, etc. Separate records are not available.

It can be easily seen that in 1913-14 there was quite an increase, but if one may judge from the rate of registration this year, 1914-15, there is no question but that there will be a decided shrinkage in the number of horses used. Then, of course, one must remember that the local dealers sold a large number of trucks last year over the year before.

The horsepower of these 1254 trucks ranges anywhere from 1½ to 75. Over 26 per cent. of the commercial cars used are equipped with 22 h.p. engine.

Ten styles of bodies are used; 61.84 per cent. were of the truck type; 35.68 per cent. were deliveries; 1.12 per cent. were express wagons; .56 per cent. work wagons; .21 per cent. undertaker wagon bodies; .21 per cent. hearses; .21 per cent. baggage wagon bodies; .16 per cent. ambulance bodies; .16 per cent. tank wagons, and .08 per cent. light truck bodies.

Out of the 182 different businesses the number of trucks engaged in each business ranged anywhere from 1 to 95. The greatest user of commercial cars being the grocers.

The express companies are next in line as the large users of commercial motor vehicles. They have 49 motor vehicles in operation, of which 34 are electrics and the balance are gasoline trucks. The horsepowers used range 3½ to 48. The greatest number of gasoline trucks are 18 h.p., while the 4 h.p. predominates among the electrics. Two styles of bodies, namely: express wagon bodies, of which there are 14, and of the truck type there are 35.

Local brewers follow close behind the express companies as motor truck users. At the present time 48 trucks are in operation. All of these are gasoline motor trucks with the exception of 3, which are electrics. Fifteen of the trucks have 38 h.p. engines, while the remainder are divided up between 14 different horsepowers, ranging from 3 to 48 h.p. Out of 48 trucks used by the local brewing industry 45 are equipped with the truck type of body, while the remaining 3 are deliveries.

With a representation of 168 makes of machines in Buffalo the Ford leads the procession with a total number of 159 in operation, or 12.72 per cent. Next in line comes the Pierce-Arrow, which has 113 trucks operating in Buffalo, or 9 per cent. The Atterbury and Stewart run a tie for third place, as each have 85 truck users in Buffalo, while the Buick is fourth with 73.

The Ford truck is used in 42 different kinds of businesses in Buffalo and leads all other makes among the grocers. Stewart motor truck comes next, as it is used in 41 different kinds of business and leads all of its competitors among the newspaper publishers. The Pierce-Arrow may be seen in 33 different occupations and leads amongst the brewers, while the Atterbury, which is busy in 39 different businesses, leads amongst the moving and carting trade. The Buick truck is kept busy in 38 different occupations and leads amongst the florists.

The summary of the writer's findings relative to motor trucks as used in Buffalo are very briefly tabulated as follows:

Bodies

Style or Type.	Number.
Ambulance	2
Baggage Wagon	3
Delivery	446
Express Wagon	14
Hearse	3
Tank Wagon	2
Truck	773
Undertaker Wagon	3
Light Truck	1
Work Wagon	7

Leading Makes

(Numerically)

Make.	Number.
Adams	17
Atterbury	85
Autocar	26
Baker	15
Buick	73
Cadillac	55
Cartercar	21
Federal	19
Ford	159
G. V. T.	42
Grabowsky	38
International	28
Lippard-Stewart	29
Overland	28
Packard	20
Peerless	14
Pierce-Arrow	113
Studebaker	46
Stewart	85
Thomas	22
White	22

Number Engaged in Each Business

Auto Mfg.	3
Auto Repairs	8
Bakers	25
Bakers' Supplies	4
Bag Mfg.	3
Bedstead Mfg.	7
Box Mfg.	3
Brewers	48
Building Cont.	20
Butter & Eggs	4
Cheese	3
Cleaning & Dye.	13
Comm. Merchant	23
Coal & Wood	28
Confectioners	3
Dept. Stores	36
Delivery Cos.	11
Dairy	10
Door Mfg.	3
Druggists	6
Electric Traction Cos.	3
Express Cos.	49
Feed & Flour Dealers	3
Fish & Oysters	11
Florists	17
Furniture	8
Garage	3
Gas Cos.	10
Gen'l Contractor	10
Grocers	95
Hardware	20
Ice	5
Ice Cream Mfg.	42
Iron & Steel Mfg.	6
Laundry	7
Lumber & Mill	15
Malster	4
Mason Contractor	8
Mantel & Tile Dealer	3
Machine Shop	3
Marine & Engineers' Supplies	4
Meat Market	31
Meat Packers	11
Men's Furnishing	8
Millinery	3
Moving & Carting	70
Newspapers	60
Oil	15
Paints, Oils, Glass, Etc.	3
Painters	5
Plumbers	32
Plumbers' Supplies	4
Plaster & Cement Dealers	8
Poultry	3
Power Cos.	23
Radiator Mfg.	4
Restaurants	3
Roofing Contractor	3
Rubber & Tires	9
Sand & Gravel	11
Sheet Metal Wk.	7
Sign Painter	3
Soft Drinks	10
Soap Mfg.	18
Spring Water	5
Tea & Coffee	6
Telephone Cos.	8
Transfer Cos.	33
Transportation Cos.	4
Truck Mfg.	13
Truck Dealers	17
Upholsters	3
Unclassified***	141
Undertakers	20
Victrola Dealers	3
Wall Paper	4
Wines & Liquors	12

*** This classification means that the truck is being used for various purposes

The CCJ is the only truck journal a member of the Audit Bureau of Circulations—Why?

JOSEPH HORNE CO.–36 WHITE TRUCKS
EVANSVILLE BREWING ASSN. 8 WHITE TRUCKS
THE ATLANTIC REFINING CO. 91 WHITE TRUCKS
KAUFMANN & BAER CO. 40 WHITE TRUCKS
INDEPENDENT BREWING CO. 7 WHITE TRUCKS
FRANK PARMELEE CO. 9 WHITE TRUCKS
NATIONAL CASKET CO. 14 WHITE TRUCKS
THE B.F. GOODRICH CO.–18 WHITE TRUCKS
CITY OF NEW YORK 12 WHITE TRUCKS
AMERICAN CAN CO.–8 WHITE TRUCKS
MANDEL BROS. 17 WHITE TRUCKS
T. EATON CO. Ltd. 14 WHITE TRUCKS
SPEAR & CO. 15 WHITE TRUCKS
B. ALTMAN & CO. 35 WHITE TRUCKS
MARSHALL FIELD & CO. 15 WHITE TRUCKS
GREENFIELD ELECTRIC LIGHT & POWER CO 10 WHITE TRUCKS
THE HIGBEE COMPANY 10 WHITE TRUCKS
GIMBEL BROTHERS 54 WHITE TRUCKS
STANDARD OIL CO. of NEW YORK 90 WHITE TRUCKS
ARMOUR & COMPANY 73 WHITE TRUCKS
CHICAGO FIRE INSURANCE BOARD 13 WHITE TRUCKS
THE CLEVELAND AKRON BAG CO. 19 WHITE TRUCKS
GULF REFINING CO. 123 WHITE TRUCKS
W. & J. SLOANE 10 WHITE TRUCKS
STANDARD OIL CO. of INDIANA 100 WHITE TRUCKS
SAKS & COMPANY 10 WHITE TRUCKS
CITY of BOSTON 21 WHITE TRUCKS
THE BELL CO. 12 WHITE TRUCKS
THE MAY COMPANY 11 WHITE TRUCKS
NY BOARD of UNDERWRITERS 14
CITY OF CLEVELAND 18 WHITE TRUCKS
KAUFMANN BROS. 24 WHITE TRUCKS
GLACIER PARK TRANSPORTATION CO 16 WHITE TRUCKS
STERN BROTHERS – 18 WHITE TRUCKS
CITY OF PITTSBURGH 15 WHITE TRUCKS
10 WHITE TRUCKS
THE HUB 10 WHITE TRUCKS
SCHULZE BAKING CO. 17 WHITE TRUCKS
LOS ANGELES BREWING CO. 13 WHITE TRUCKS
BOGGS & BUHL 28 WHITE TRUCKS
D.O. SUMMERS CLEANING CO.
SUPREME BAKING CO. 19 WHITE TRUCKS
TELLING'S ICE CREAM
ATLANTIC ICE & COAL CORPORATION 15 WHITE TRUCKS
UNITED STATES POST OFFICE DEPT. 28 WHITE TRUCKS
OPPENHEIM COLLINS & CO. 20
THE ROSENBAUM CO. 35 WHITE TRUCKS
ASSOCIATED BELL TELEPHONE CO'S 47 WHITE TRUCKS
TELLING BROTHERS CO. 10 WHITE TRUCKS

White Building Makes White Truck Performance a Law Unto Itself in Length as in Perfection of Service

COMPARISONS may be "odious" but they eliminate the unfit. The comparative test of side-by-side service is the only fair way to find out which truck is doing the work steadiest, at lowest cost and for the longest time. Because of such tests White Trucks predominate in most large fleets in the country.

Faithfully, year in and year out, a White can be relied on to do your work at a big saving per ton mile. It keeps, practically, in constant commission, and operates with mechanical perfection which is almost a "thinking" intelligence.

And in a short time it pays for itself with big dividend on the investment. And long after the time when, judged by ordinary standards, it would have ceased to exist on the company's books, the White keeps on going.

It stays on the job; it defies the junk pile; it knocks into a cocked hat all previous ideas of motor truck "depreciation."

Efficiency reasons dispose of the laggards in all departments of the world's work. They explain the striking preponderance of White Trucks. Ask any White owner; he has figured it out in dollars and cents.

We shall be glad to make suggestions on *your* trucking problem.

Exhibiting at the Transportation Building, Panama-Pacific International Exposition, San Francisco

THE WHITE COMPANY
CLEVELAND
LARGEST MANUFACTURERS OF COMMERCIAL MOTOR VEHICLES IN AMERICA

New York	Broadway at Sixty-Second Street	Pittsburgh	Craig Street and Baum Boulevard	Seattle	1514 Third Avenue
Chicago	2635-2645 Wabash Avenue	Atlanta	63-65 Ivy Street	Memphis	278-280 Monroe Avenue
Philadelphia	216-220 North Broad Street	St. Louis	3422 Lindell Boulevard	Dallas	2025-2027 Commerce Street
Boston	930 Commonwealth Avenue	Washington	1233 20th Street N. W.	Toronto	14 Alexander Street
San Francisco	Market St. and Van Ness Avenue	New Orleans	750 St. Charles Avenue	Montreal	Forum Building
Baltimore	Mount Royal and Guilford Avenues	Newark	33-35 William Street	Winnipeg	230 Fort Street

FEDDERS RADIATORS

IN both branches of the automobile industry there are a number of manufacturers whose products not only have by their excellence and performances come through and established certain standards of construction and equipment.

Many of these manufacturers have been consistent users of Fedders Radiators from the first —throughout their development periods—and now that their business has settled down upon a firm, practical and substantial basis they continue to do so.

Does Fedders Quality need any more practical demonstration than this?

FEDDERS MFG. CO., Inc.
BUFFALO NEW YORK

J-M Automobile Accessories

J-M NON-BURN BRAKE LINING

A true safeguard and a real economy. Grips positively and lasts longer. Sold by all good dealers. Ask for it by name.

LONG HORN

Remarkable warning efficiency. Tried and proven construction. Hand-operated. First cost the only cost. Special model for motor trucks.

CARTER CARBURETOR

Multiple-Jet

Insures a marked saving of fuel attended by a marked increase of power. Especially adapted to truck motors. Only one adjustment.

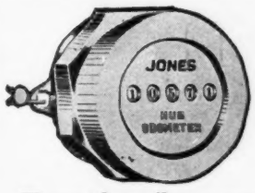
J-M AUTO CLOCK

Keeps excellent time. Runs 8 days without rewinding. Setting and winding keys concealed. Finished to match fittings of car. Two mountings, flush or dash, each $5.

Goods of known quality backed by a known organization are unquestionably the safest goods to buy.

For over half a century the name Johns-Manville has stood as a guarantee for products of proven excellence.

One Firm ***One Service*** ***One Guarantee***



Keep Tabs On Your Truck Costs

Know the mileage you are getting from every gallon of fuel, from every gallon of lubricant, and from every set of tires.

These things you can tell with absolute accuracy if your trucks are equipped with the

JONES HUB ODOMETER

The Jones Hub Odometer is a mileage recorder that registers every mile of ground traveled in figures that are absolutely indisputable.

It acts as your personal representative indicating at once any unauthorized use of your truck and helping you to determine the relative efficiency of your drivers.

In many other ways the Jones Hub Odometer will be found indispensable. It is both the simplest and most accurate mileage recorder made. It fits all standard makes of motor trucks, replacing the regular hub cap. Permanently sealed when attached to prevent tampering.

When ordering specify name of truck, year built, model number or letter. Also wheel diameter and, if possible, actual wheel travel through one revolution. Price $20.

J-M (Mezger) Soot-Proof SPARK PLUG

Soot-Proof Means Positive Ignition

Carbon takes the "kick" out of the spark plug that isn't soot-proof.

Lost "kick" means lost power.

On the other hand J-M (Mezger) Soot-Proof Plugs absolutely insure complete combustion every shot because they are built *literally soot-proof.*

No matter how much carbon may collect around the electrode, with J-M (Mezger) construction a weakened spark or a short-circuit is impossible.

That means positive ignition.

Now add to this advantage other advantages such as the permanently gas-tight joints, durable insulator and two-unit design for easy disassembling. Now you have a plug that is a *real* plug and a *real* economy to boot. Sizes for all motor trucks. Price 75 cents each.

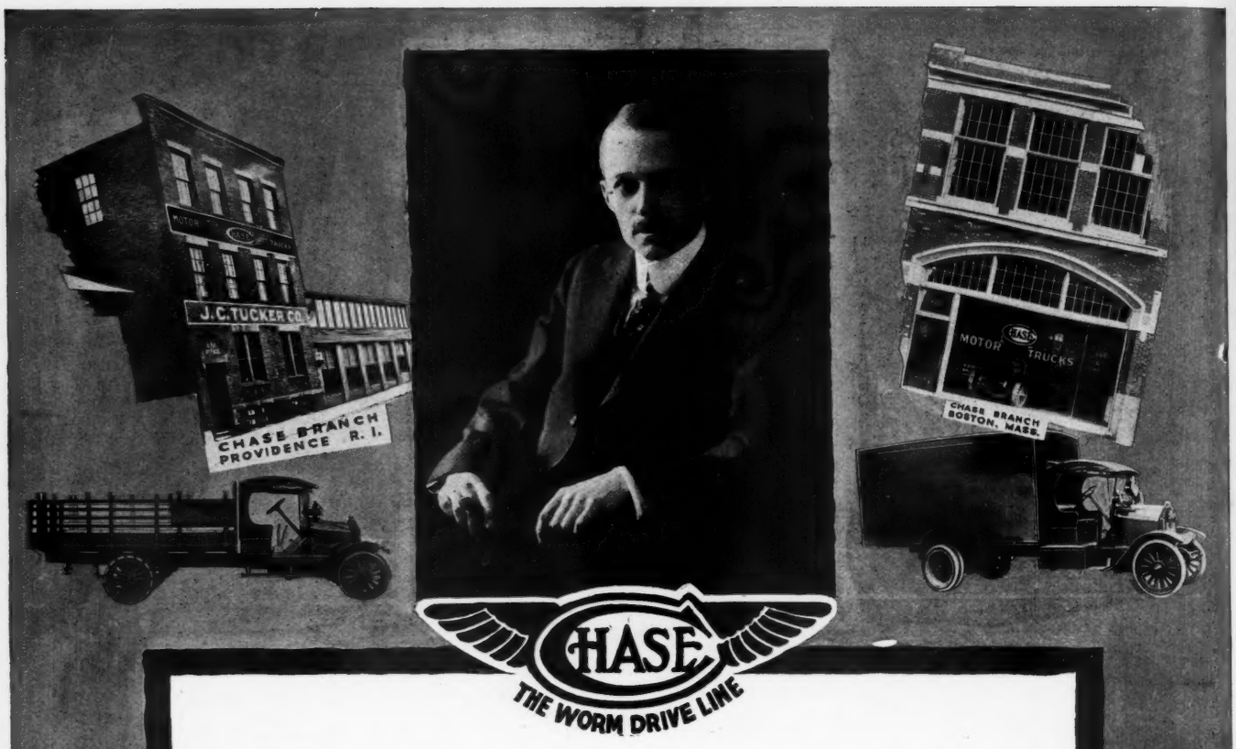
Write for booklet today.

H·W·JOHNS-MANVILLE CO·

Akron, Albany, Atlanta, Baltimore, Birmingham, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Dayton, Denver, Detroit, Duluth, Galveston, Houghton, Houston, Indianapolis, Kansas City, Los Angeles, Louisville, Memphis, Milwaukee, Minneapolis, Newark, New Orleans, New York, Omaha, Philadelphia, Pittsburgh, Portland, Rochester, St. Louis, St. Paul, Salt Lake City, San Francisco, Seattle, Syracuse, Toledo, Washington, Wilkes-Barre, Youngstown

THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED Toronto Montreal Winnipeg Vancouver

317C



CHASE
THE WORM DRIVE LINE

What a Big Dealer Says About CHASE TRUCKS

"I have been in the automobile business for 10 years. During this time I have sold numerous makes of commercial cars, and I honestly believe that the Chase truck of today is as representative in value, dollar for dollar, pound for pound, as any car being built. The construction throughout—the power—and the great strength of these cars combine to produce their well-recognized superiority.

"Our two branches—Providence and Boston—have successfully introduced the line in the East, and I am pleased to say that you may book our order for seven more Model O chassis, four Model R express, and two Model T panel top. See letter for special instructions.

"Accept my appreciation for the co-operation which you have extended me and for the prompt and efficient manner of handling our demands."

A. W. Flinn, General Manager,
J. C. Tucker Co.,
Narragansett Pier, R. I.
New England Distributors for Chase Trucks.

From a letter by Mr. Flinn to the Chase Factory.

Chase Motor Truck Co.

104 West Street Syracuse, N. Y.

"CHASE YOUR DELIVERY"

SIGNAL

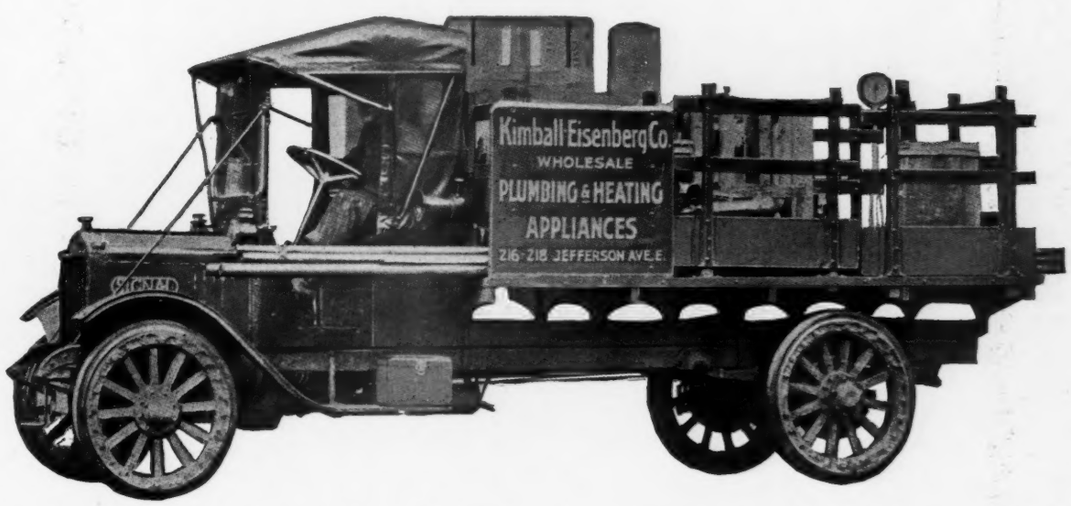
Worm-Drive Trucks

Simple, Silent and Efficient

The Signal Line

One ton Chain-drive chassis	$1400
One ton Worm-drive chassis	$1500
One and one-half ton Worm-drive chassis	$1700
Two ton Worm-drive chassis	$2000
Three and one-half ton Worm-drive chassis	$3000

All prices F. O. B. Detroit



Worm-Drive Truck Used in a Wholesale Plumbing and Heating Business

Signal Motor Truck Company

Motor Truck Manufacturers

Detroit, Michigan, U. S. A.

When Writing, Please Say—"Saw Your Ad. in the CCJ"

On The Hill Or Level The Simplex Takes Hold

Here is the jack that does perfect work in any position, wherever the car stops, on hill, in mud, or rut.

Up goes the load faster and easier than with any other jack made.

SIMPLEX JACKS

lift any load from the Ford to the heaviest truck. No barking of knuckles—hand away from the car.

This is the jack that won the gold medal given by the American Museum of Safety for the safety of jacks.

Never drops the load. Greatest range of lifts. For the motorist—the perfect jack. For the dealer—a fast selling accessory.

TEMPLETON, KENLY & CO., Ltd.

Manufacturers of

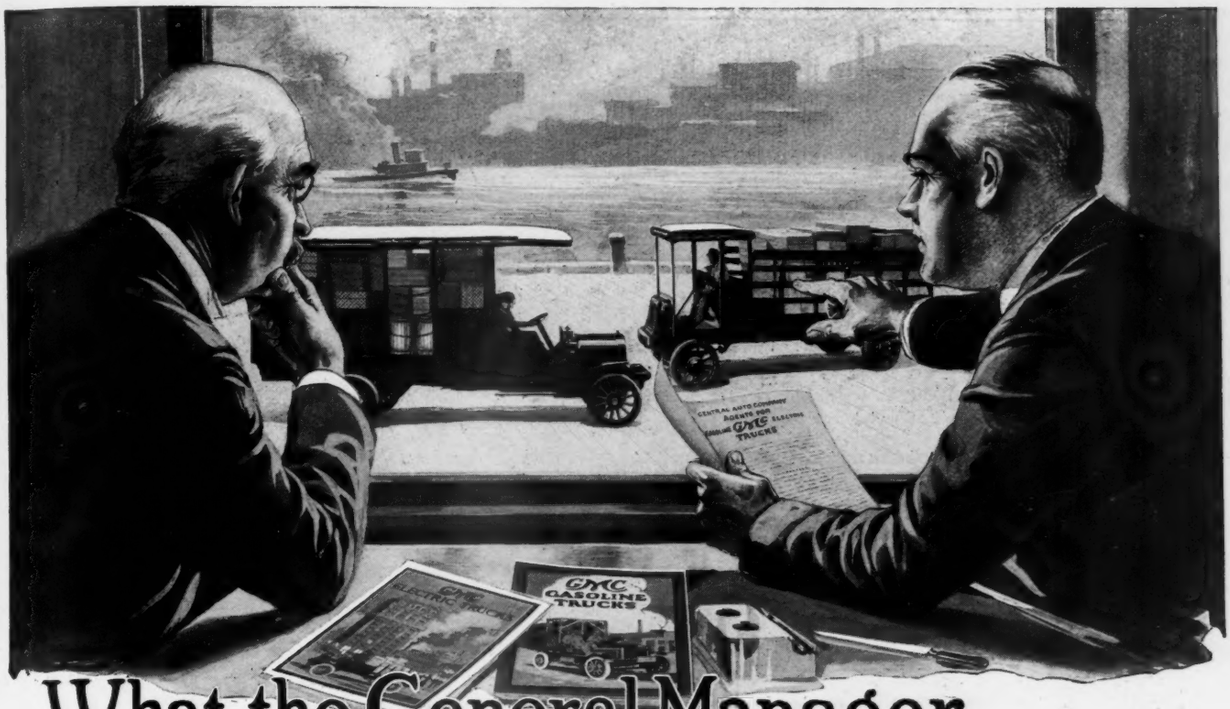
SIMPLEX JACKS FOR AUTOMOBILES, RAILROADS, AGRICULTURAL AND ALL CLASSES OF INDUSTRIES

1007 SOUTH CENTRAL AVE.
CHICAGO, ILL.

You can take the load from any position on the cap, the bottom shoe, the detachable shoe. Up she goes on hillsides, in mud, anywhere.

A Jack for Every Job

No. 36—½ Ton Capacity.
No. 41—One Ton Capacity.
No. 42—Two Ton Capacity.
No. 43—Three Ton Capacity.



What the General Manager said to the President

"I'll tell you, Mr. Miller, we're losing money every day we postpone the change from horses to motor trucks, and now that we have an opportunity to dispose of our horses at a good price, *right now* is the time for us to make the decision. I am thoroughly convinced that this is the thing to do and I think the facts I have gathered together will convince you, too.

"Our total investment in motor equipment to handle 50% more freight than we are now hauling would be very little more than we have invested in our present outfit.

"We are using valuable ground for stable and shed room now that we need, and need badly, for an addition to our warehouse. Trucks wouldn't require half the room and we could use cheaper space farther out.

"I've spent a lot of time investigating this matter, and the saving per ton mile on our haulage will alone put us to the good in less than a year—to say nothing of the better service to our customers and the ability to extend our field of operations.

"So far as I am concerned, the only question to settle is the kind of trucks that we ought to install. I've investigated several of the leading makes—all of them good, but this GMC line appeals most to me. They make a full line of both gasoline and electric trucks, and their prices are mighty reasonable.

"It's my opinion, based on my investigations to date, that we ought to use both electric and gasoline. The GMC agents offer to have a transportation man come here and help us analyze the proposition. Their experience would, of course, be valuable to us, and as they make both kinds of trucks, their advice would be without prejudice. What do you think?"

"Well, Harper, I believe your judgment is good. I suggest that you write the GMC agency today and let them get on the job and see just what we need. If we are going to make the change, the sooner the better."

Harper did write, we got on the job, secured the order and the trucks are making good. They'll make good for anyone with a haulage problem of any kind.

An exhibition of GMC Trucks is being held in the Transportation Building, Panama-Pacific Exposition, San Francisco

GMC
GENERAL MOTORS COMPANY
TRUCKS

Gasoline ***Electric***

We make gasoline trucks from 1,500 lbs. to 5 tons capacity; electrics from 1,000 lbs. to 6 tons. In gasoline trucks, we make both worm and chain drive. We make a truck to fit *your* business. Why not do as Harper did?—write us today.

GENERAL MOTORS TRUCK COMPANY

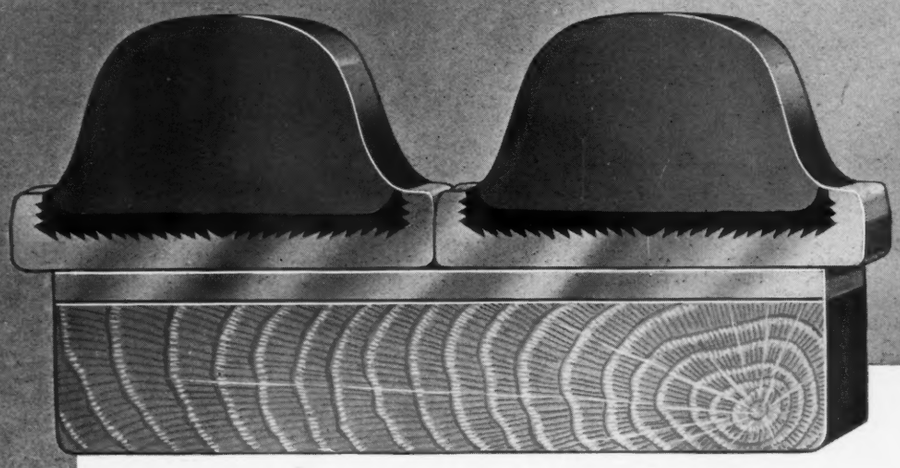
One of the Units of General Motors Co.

Pontiac **Michigan**

Direct Factory Branches:

New York **Philadelphia** **St. Louis** **Boston** **Kansas City** **Chicago** **San Francisco**

(1)



GIBNEY

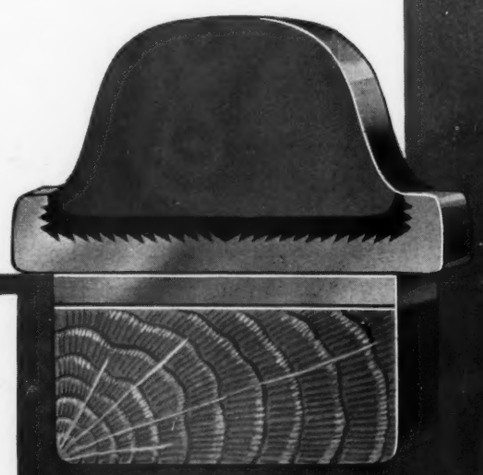
PRESSED-ON

WIRELESS TIRES

The most phenomenal growth in the truck tire field is that of GIBNEY TIRES. They have grown from a very modest beginning to be the leaders in their field. Most significant of all—this growth has been due solely to merit.

GIBNEY TIRES have fought their way to the front by virtue of what they did on streets and roads. They have been bought and placed on truck after truck because cold-blooded analysis proved they gave greater mileage at less cost than other makes. They have supplanted other much lauded tires because the cost sheets showed more value per dollar of cost.

GIBNEY TIRES are made in Pressed-on and Demountable types. They are simple in construction and offer you more for your money than you can get elsewhere. It's to your interest to buy them for your trucks.



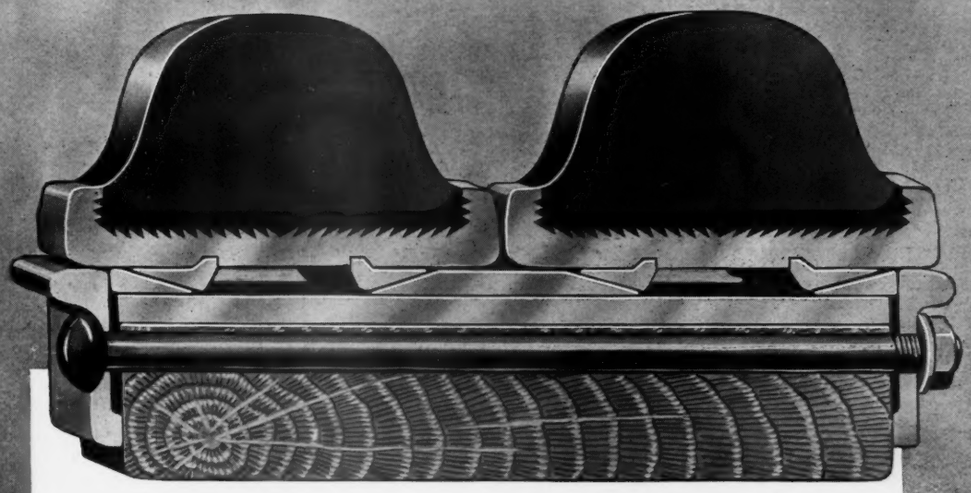
GIBNEY TIRE & RUBBER CO.

Factory, Conshohocken, Pa.

BRANCHES

New York, Philadelphia, Boston, Detroit, Chicago, London, Paris

AGENCIES—Washington, Baltimore, Norfolk, Wilmington, Harrisburg, Cincinnati, St. Louis, Kansas City, Milwaukee, St. Paul, Minneapolis, Duluth, Paterson, Elizabeth, Newark, Worcester.



GIBNEY

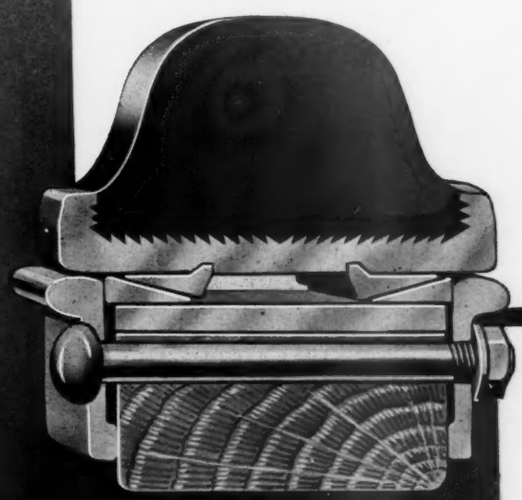
DEMOUNTABLE

WIRELESS TIRES

GIBNEY TIRES are as big a success from the dealer's standpoint as they are from that of achievement. They give such exceptional service that they soon sell on their reputation and repeat orders are certain.

Conditions like this mean good profit for the dealer and a rapidly increasing business that assures future prosperity.

The exclusive agency proposition on which GIBNEY TIRES are marketed, offers energetic dealers splendid opportunties for big profits and an assurance of reaping the harvest on all missionary work they do.



If you desire to enter the truck tire field, write for the details of our exclusive agency proposition, provided we are not represented in your locality. It is the biggest opportunity in the tire field today.

GIBNEY TIRE & RUBBER CO.

Factory, Conshohocken, Pa.

BRANCHES

New York, Philadelphia, Boston, Detroit, Chicago, London, Paris

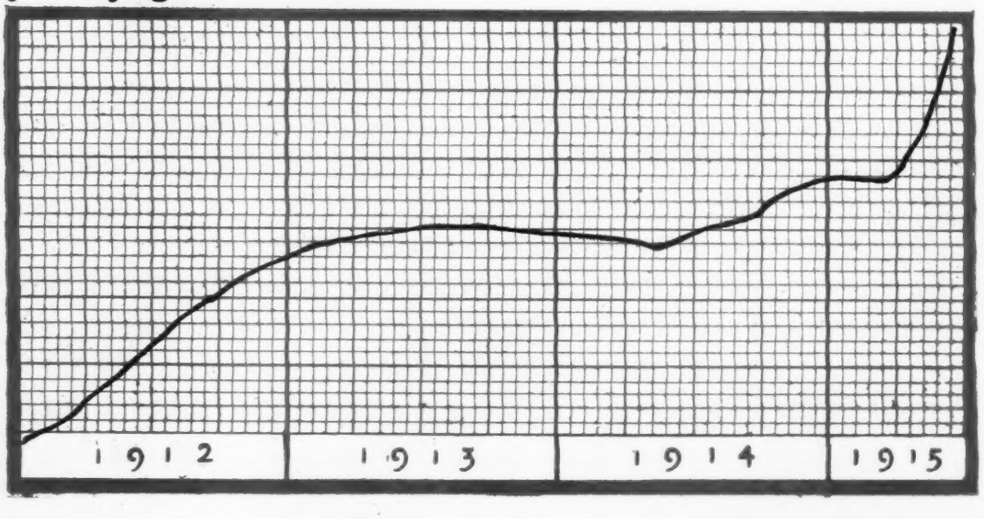
AGENCIES—Washington, Baltimore, Norfolk, Wilmington, Harrisburg, Cincinnati, St. Louis, Kansas City, Milwaukee, St. Paul, Minneapolis, Duluth, Paterson, Elizabeth, Newark, Worcester.

Graphic Proof of the Wisdom of Specialized Manufacture

SHEL,I

WORM GE AI

This chart indicates growth by yearly gross sales



These are the Fundamen ta

Semi-floating construction — with its consequent simplicity, lightness and extreme durability.

THE SHELDON AXLE A N

Makers of Springs and Axles for Heavy Duty

WILKES-BARRE

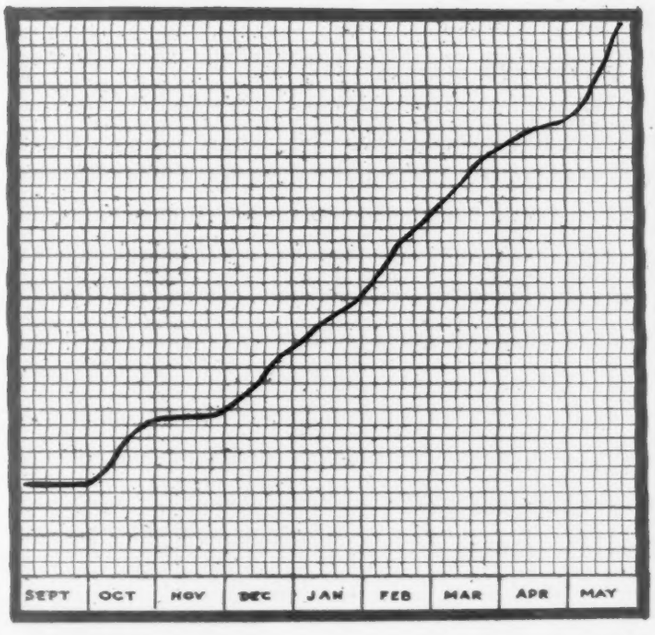
Chicago:
122 S. Michigan Blvd.
"Exhibiting Section 16, Transportation Bldg." 121 5 Pana

When Writing, Please Say—"Saw Your Ad. in the CCJ"

Shown in the Growth of SHELDON Worm Gear Axle Production

,I,DON
GL AR AXLES

This chart indicates monthly shipment increase



tals of Sheldon Success

Heavy worm thrust load taken by ball bearings—insuring low friction and absence of wedging.

ND SPRING COMPANY

Duty Service for More Than 50 Years

Detroit:
121 5 Woodward Ave.

San Francisco:
444 Market St.

PENNSYLVANIA

Panama-Pacific Exposition, San Francisco"

When Writing, Please Say—"Saw Your Ad. in the CCJ"

All Truck Tire Money Back

If a Goodyear S-V Fails to Meet This Test

We are ready now—after 5000 careful tests—to issue this defiance to all other Truck Tire claims.

We shall not merely argue that Goodyear S-V's excel every rival Truck Tire. We shall *guarantee* it in this convincing way.

Equip opposite wheels—at the same time—one with a Goodyear S-V, one with any other standard Truck Tire of like rated size, bought in the open market.

If the Goodyear S-V fails to cost less per mile than the other, we will return you its full purchase price, making the S-V free.

This offer is unlimited as to number of tires. Equip as many wheels as you wish under these conditions. Sign with us the proper blank when the tires go on.

But it is limited to tires bought in April, May and June. It is simply to show you, in a vivid way, that Goodyear now outranks all others in this line. Our regular mileage guarantee applies to these tires, in addition.

Accept this challenge. Let us prove, at our complete risk, that Goodyear S-V's will cut down your tire bills.

Why We Dare Do That

This means in three months a tremendous stake, and against the entire field.

But we have spent 8 years perfecting this Truck Tire. Scores of experts have worked on it. They built 29 types in their progress toward this one. Then they built 74 structures to attain the utmost in this type.

Our offer is based on records of 5000 test tires. And on side-by-side tests with rivals under all conditions. We know that none can stand up with S-V's.

The Reasons

We give you 20 per cent more available tread rubber.

We give you a shape which ends bulging or breaking by distributing heavy loads equally. And a shape which saves grind.

By a secret method, we weld the soft rubber tread, the hard rubber backing and the steel channel base into a lifelong union.

We press the tires on—in 5 or 10 minutes—at a minimum of 50,000 pounds. Thus they cannot creep. In this tire there is no auxiliary fastening whatsoever.

GOODYEAR
AKRON, OHIO
S-V Truck Tires

We give you a compound which saves undue friction, taxing tire and power.

This new Goodyear S-V appears to us the limit in a Truck Tire. Certainly it excels any rival production. We are staking on that fact the whole price of the tire.

We invite every truck owner who wants to end tire troubles to let us show him the way at our risk. Consult your dealer or our nearest branch.

THE GOODYEAR TIRE & RUBBER CO., Desk 94, Akron, Ohio

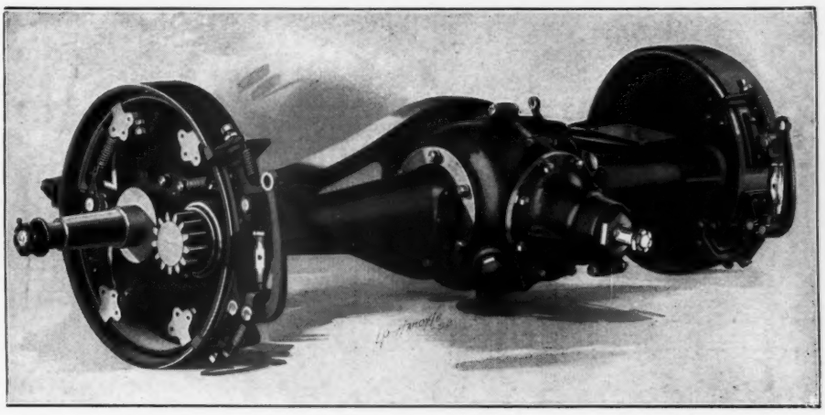
Makers of Goodyear Automobile Tires

We Make Demountable, Block, Cushion, Pneumatic, and Other Types of Truck Tires (2313)

Celfor Axles

INTERNAL GEAR DRIVE

Makes any truck more salable



The incorporation of CELFOR INTERNAL GEAR DRIVE AXLES in any truck makes that truck easier to sell because it supplies certain qualities which make a truck more valuable and desirable.

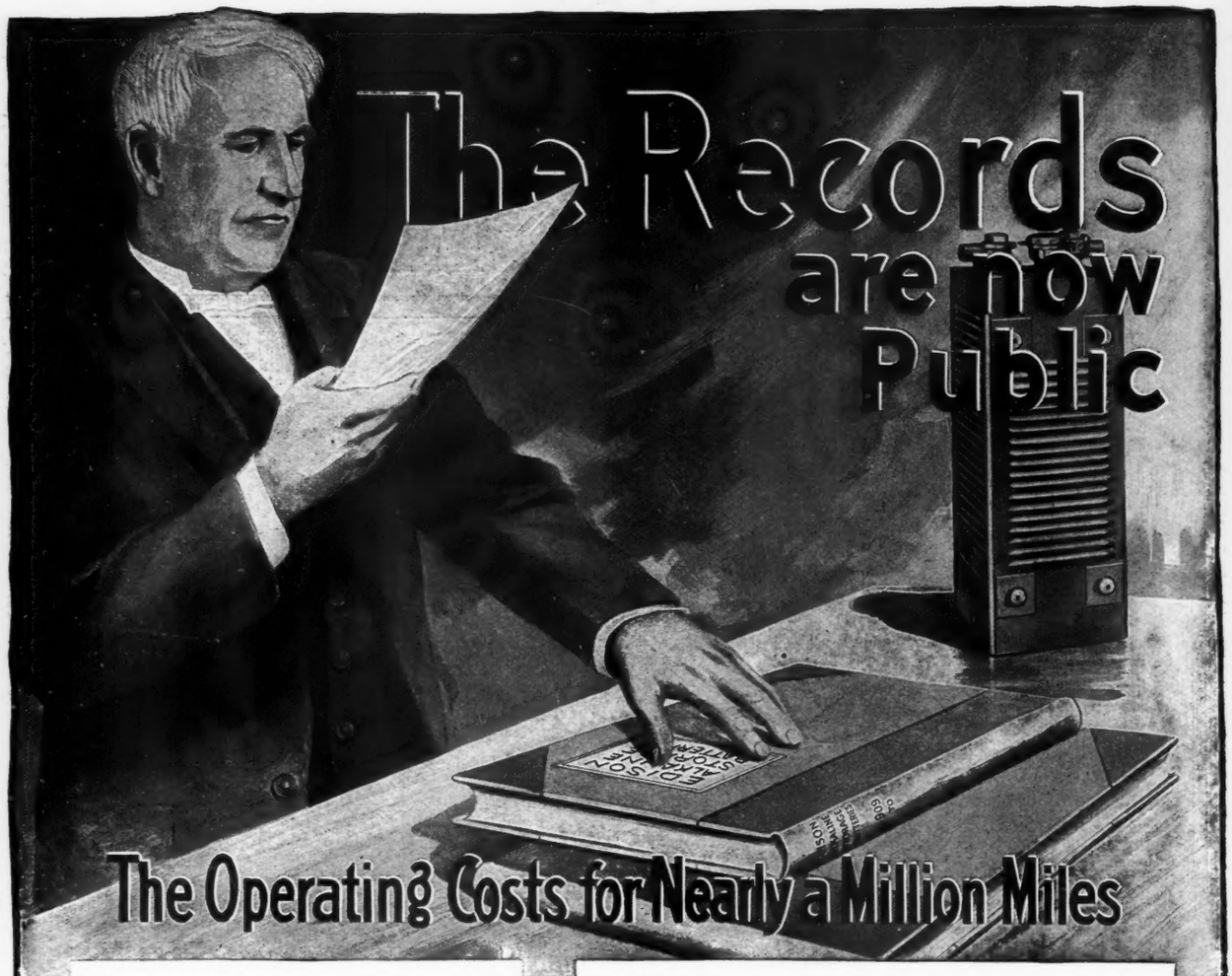
Among these qualities are the following: It has a solid I-beam axle to carry the load; power is transmitted through a ribbed tubular live axle; the final application of power is at the wheel at a considerable distance from its center; all working parts are enclosed in a dust and waterproof chamber; it is quiet in operation and has long life; it is less costly than other drives; all parts are interchangeable and there are no right and left-hand parts except in the differential; it is the most economical drive.

These are vital considerations which should induce you to investigate the advisability of using CELFOR AXLES in your trucks.

¾ to 3 ton capacities. Send for catalog and prices

Celfor Tool Company

BUCHANAN, MICHIGAN U.S.A.

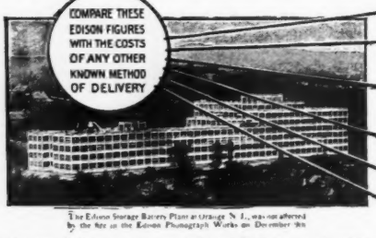


The Operating Costs for Nearly a Million Miles

I CLAIMED that the **New Alkaline Storage Battery** would make the Electric Vehicle the cheapest means of Street Transportation, but I had only my private tests to satisfy me. Today thousands of Edison Batteries in thousands *of* Trucks and Delivery Wagons are making Operating Records that are easily investigated by all. After the four or five years of hard service that many of these vehicles have had, is it possible to deny that my claim is proved?

Thomas A. Edison

HERE IS ONE RECORD—A REPORT—ON 22 FIVE-YEAR-OLD EDISON BATTERIES



The Edison Storage Battery Plant at Orange N. J., was not affected by the fire as the Edison Phonograph Works on December 9th

Write for Bulletins on the use of **Edison Batteries** for Lighting Country Houses, Ignition and Lighting of Gasoline Cars, Yacht Lighting, Railway Train Lighting and Signaling, Telephone, Telegraph and Wireless *and High-priced or Low-priced Passenger Electrics.*

Edison Storage Battery Company
Orange, New Jersey

Distributors in { New York Chicago Boston Cleveland Washington / San Francisco Los Angeles Portland, Oregon Seattle

ADAMS EXPRESS COMPANY
242 WEST 47TH STREET

MOTOR VEHICLE DEPARTMENT
GEORGE STEVENS
SUPERINTENDENT

NEW YORK, December 7th 1914

Edison Storage Battery Company,
Orange, N. J.

Attention of
Mr. A. Bachman,
V.P.& Genl Mngr.

Gentlemen:-

Thank you for consenting to extend from five to six years the conditions of your guarantee regarding renewal of positive plates.

The average operating cost per battery per month of the twenty-two trucks at Indianapolis, equipped with Edison Batteries in November 1909 and averaging about 660 miles per month, is as follows:-

YEAR	BATTERY MAINTENANCE (Refilling, new solution, watering, cleaning, all repairs, inspection, etc.) Material	Labor	CURRENT (Purchased by meter)	TOTAL
1910	$3.47	$4.10	$10.05	$17.62
1911	3.41	4.10	8.93	16.44
1912	3.41	4.10	9.90	17.41
1913	2.86	4.10	8.17	15.13
1914(to Oct.31)	3.11	4.10	9.50	16.17

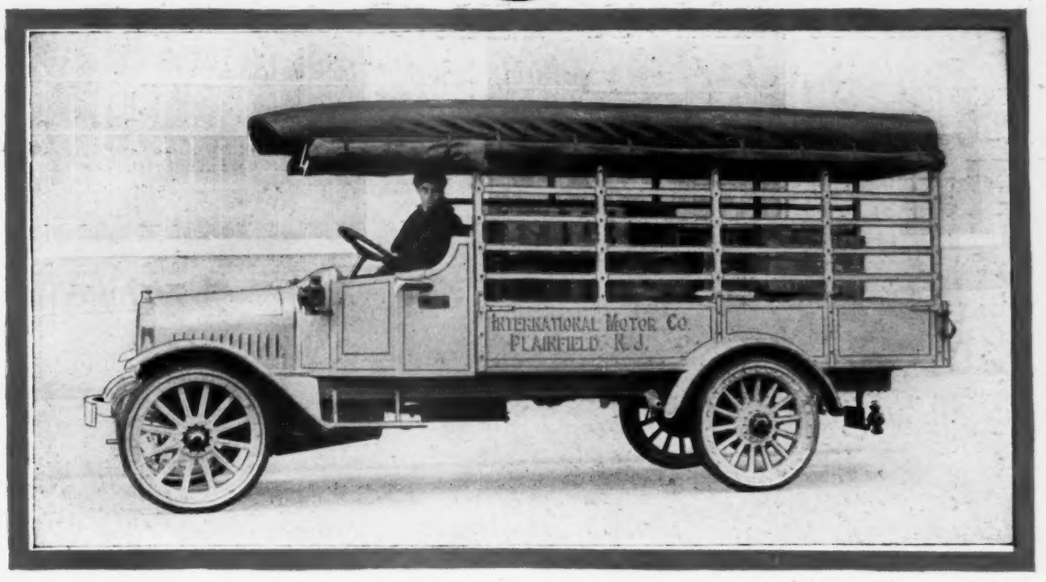
The average total operating cost per battery per month has, therefore, been $16.55 for a period of five years. In this time the average mileage per truck was about 40,000, which reduces the operating cost to $.02½ per mile. The batteries are still in service.

Yours very truly,

Geo. Stevens

GS•HHW

Superintendent



GET IT WITH MACKS

SHORT haul freight is at best unprofitable business for railroads.

The railroad's short haul is a profitable long haul for a motor truck which gives better service and cuts delivery time four fifths. Long haul by motor truck is a coming big factor in transportation.

The Paterson & New York Express Company move 1080 ton-miles of freight and express *per day* with three Macks.

This long haul express service offers an excellent opportunity for dealers to interest expressmen in their localities.

We are issuing at regular intervals carefully prepared literature to assist our dealers in following up prospects in this line of business. Let us tell you about Mack trucks with particular reference to long haul service.

INTERNATIONAL MOTOR COMPANY
64TH STREET & WEST END AVENUE, NEW YORK CITY

Another FEDERAL Endorsement

J. A. CRAMER
Buffalo, N. Y.
Federal Distributor

PHONES TUPPER 1007 FRONTIER 2007

J. A. CRAMER
DISTRIBUTOR OF
AUTOMOBILES - TRUCKS

737-739-741 MAIN ST.

Buffalo N.Y. September 19, 1914.

Federal Motor Truck Co.,
Detroit, Mich.

Gentlemen:-

I have sold the Federal truck for about three years, and have found the Federal account a highly satisfactory one.

Federal trucks are very easy to maintain, and I believe the service that is necessary to extend to owners of Federal trucks is as little as could be expected of any thoroughly high-class truck.

We have, without any large expense, been able to render very satisfactory service to all our Federal owners. Federal drivers are easily taught to look after their own truck, which reduces the expense of the owner to a minimum.

The Federal enjoys a very excellent reputation in our territory, and we are pleased to represent so good a truck at so reasonable a price.

Yours very truly,

JAC/D

"I have sold the Federal Truck for about three years, and have found the Federal account a very satisfactory one."

The sentence above expresses the feelings of every Federal dealer—the Federal account is highly satisfactory—both to the dealer, the owner and the factory.

The buyer gets the use—service from the truck that brings in repeat orders—the dealer gets the sales volume that means a good substantial profit, and the factory does a splendid business—backing up the entire dealer, owner and organization.

For this reason the Federal Motor Truck Company stands today in the enviable position that it holds all over the world, both for financial stability and the excellence of its product.

Let us show you the Federal way to increased business.

"Investigation Means Federalization"

FEDERAL
MOTOR TRUCK CO.
112-120 LEAVITT STREET
DETROIT, MICHIGAN

Extra Service at No Extra Cost

Compare McGraw Truck Tires size for size, and you will find they contain considerable more rubber than others. Think what that means in extra mileage.

Compare the quality and life of McGraw rubber and you will find it without an equal. Scientific tests prove the McGraw is over 33⅓% more resilient. Think what this means in protection from road shocks, and in saving electric current.

McGraw Truck Tires

Pressed-on Type

Compare the simplicity of the McGraw—no bolts, no special parts, no adjustments to make; McGraw channel sides protect the rubber against chafing. The McGraw can be pressed on any S. A. E. wheel band by any of the hundreds of presses now in general use. Think what valuable time that saves.

Compare our guarantee and prices and you will see the above advantages are all yours **without any extra cost.**

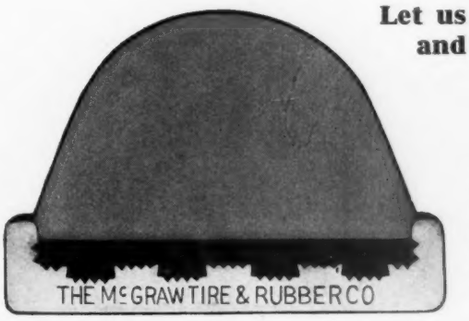
Many years of success in tire building is back of every McGraw tire—and back of the McGraw Guarantee stands the resources of one of the largest and most successful tire companies.

The McGraw Tire & Rubber Co.

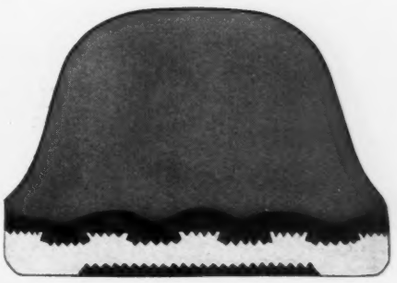
Branches and Agencies in the Principal Cities

East Palestine Ohio

Let us send you literature and name of nearest dealer



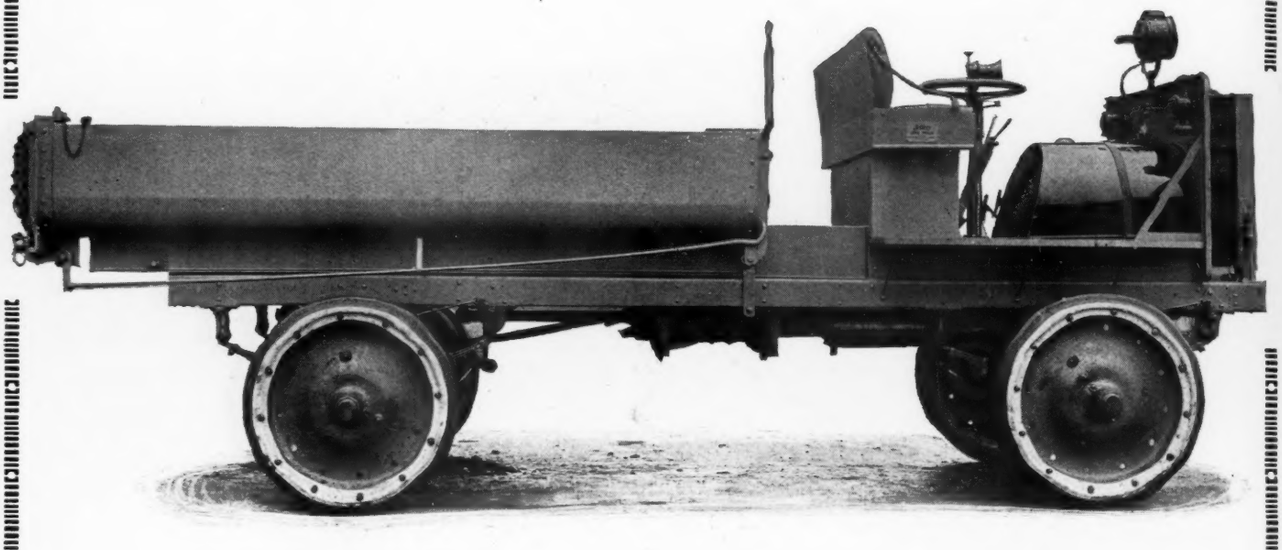
Compare these illustrations and note the extra volume of rubber in the McGraw Tire.



ALSTEL

Steel Bodies for Motor Trucks

Outlast the trucks on which they are placed



Whatever may be your haulage requirements, no matter how unusual or severe the service, we can supply you with steel truck bodies that will be best adapted to your needs and give you dependable and highly efficient service.

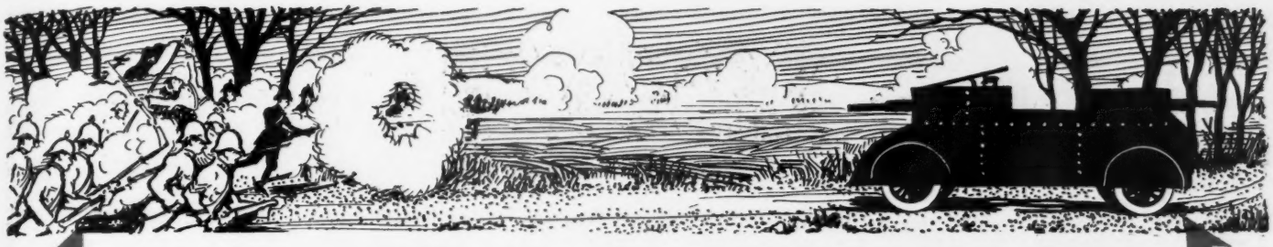
Many makers of high-grade trucks, such as the Jeffrey Quad, shown above, use our bodies with the utmost satisfaction. Our hoist-power or hand and dump bodies, in particular, have achieved remarkable success.

Send for our complete data and prices, giving body dimensions and nature of business.

MOTOR TRUCK BODY DEPARTMENT

Variety Manufacturing Co., Sacramento and Carroll Avenues, Chicago, Ill.

When Writing, Please Say—"Saw Your Ad. in the CCJ"



In the terrific strain on the battlefield and in the hardest commercial service

WEST'S CAST-STEEL WHEELS

are proving their superiority to all other wheels

The nations now at war depend almost exclusively upon steel wheels for their motor trucks, because they are unrivaled in standing up under the hardest kind of service.

Likewise in their commercial life, steel wheels are very generally found on heavy trucks, because experience has taught that they give the best service and the least trouble.

Stronger, lighter and safer than wooden wheels

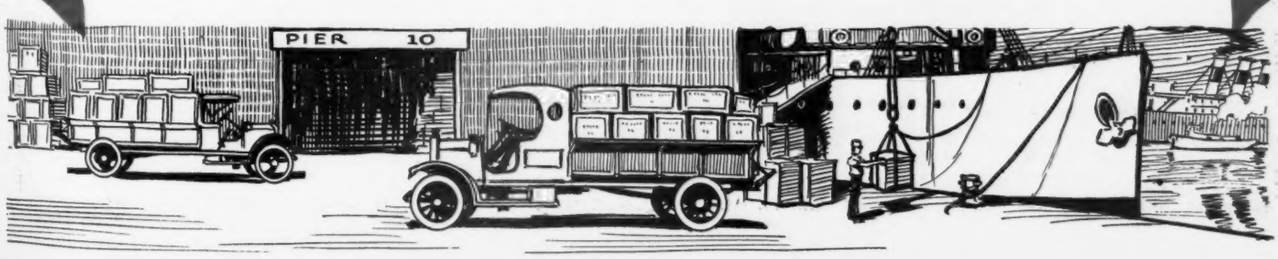
Save tire wear and wheel trouble—are more economical

The successful production of steel wheels is a matter of experience. Any steel foundry can make them, but it requires time-proved knowledge to give them the necessary life and durability. We have had **5 years** experience and have about **9000** wheels in active service and are recognized as the foremost producers in America. This assures purchasers getting the kind of wheels they require.

West's Cast-Steel Wheels are cast in one piece, have no joints to open, bolts to shear or rivets to break; will not warp, shrink, twist, loosen or get out of true and are impervious to climate.

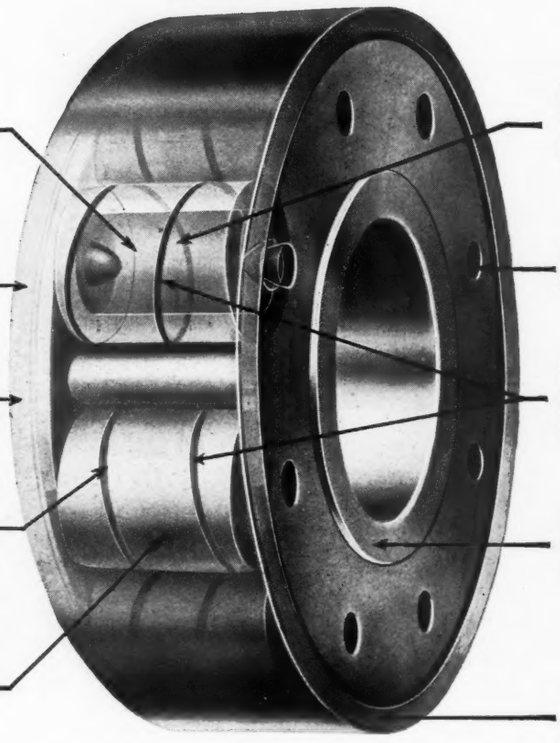
Write about them for your trucks

The West Steel Casting Co., Cleveland, Ohio



HYATT

ROLLER BEARINGS GIVE CARE-FREE SERVICE



The flexible roller cushions the road shocks, reduces noise, adjusts irregularities in alignment, and insures full line contact for the load.

No adjustment of any kind possible or necessary. Absolutely "fool proof."

Carries radial loads only, resulting in simplicity of design.

A self-cleaning bearing. Grit from gears, sand and dirt tend to pass through these slots into the center of the roller, hence do not grind away the bearing surfaces.

Rollers cannot crush or roll out. Heat treated, chrome nickel steel makes this absolutely impossible.

Hollow rollers mean large oil capacity and the constant carrying of oil from bottom to top of the bearing.

The cage keeps the rollers parallel and is convenient in assembly.

Right and left spirals insure a constant circulation of oil back and forth. Parts of the bearing cannot possibly become dry.

Inner race of special analysis steel heat treated and accurately ground. This fits over the shaft.

Outer race of special analysis steel, heat treated and accurately ground. This is held in the housing.

A Hyatt Quiet Bearing With Part of the Outer Race and One Roller Shown Transparent to Illustrate the Construction

The spiral construction is one of several exclusive features of Hyatt Roller Bearings. This makes them—

Flexible, thereby reducing noise and vibration, and insuring perfect alignment.

Self-Oiling, because the right and left spirals constantly circulate the lubricant—and

Self-Cleaning, all grit and dirt passing through the spiral slots into the center of the roller, hence not grinding the bearing surface.

These and other advantages graphically shown by the above illustration explain why more than **four million Hyatt Quiet Bearings** are used by leading motor truck and automobile manufacturers in 1915 cars.

"Bearings, Others and the Hyatt Quiet"—a book on motor car bearings in general, for prospective purchasers, sent on request.

HYATT ROLLER BEARING CO.
DETROIT, CHICAGO
NEWARK, N.J.

"To Those Who Ride on Hyatt Quiet Bearings"—a book for automobile owners, sent on request.

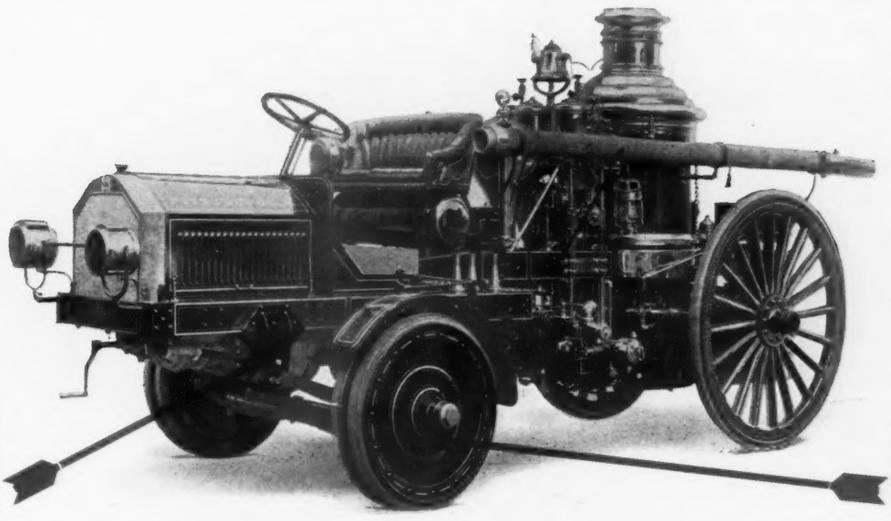
ILLUSTRATIVE LITERATURE AND POSTER STAMPS UPON REQUEST

Greatest strength is secured by using

BESCO

STEEL WHEELS

for Heavy Duty Motor Vehicles



This front spring hanger is one of a number of castings used in this tractor that were made by us from Vanadium steel, heat treated.

The wheels on this American-LaFrance tractor are "Besco"—selected because of their strength and superior qualities.

It is essential that the wheels of fire apparatus be strong and dependable, and the makers thereof have given particular attention to the selection of proper wheels. It is, therefore, very significant that the

American-LaFrance Co. makes Besco Wheels standard equipment

The cut above shows this company's new front wheel tractor which is equipped with our cast-steel disc wheel, with 38 x 4 dual tires. This wheel weighs 275 pounds finished, including a 24" brake drum cast solid with the wheel. It has an internal gear drive, the gear ring of which is bolted securely to the wheel.

In motor fire apparatus as in heavy duty trucks BESCO WHEELS have proved their supremacy to all others.

Electric-Furnace Castings

We also specialize on high-grade electric-furnace steel castings and successfully produce very thin-walled and intricately designed castings for many automobile makers. Try us on this work.

BUCHANAN ELECTRIC STEEL CO., Buchanan, Mich.

Originators and Designers of Cast-Steel Disc Wheels for Motor Vehicles

Originators and Designers of Double-Disc Pressed-Steel Wheels

A "simple" but valid reason for using Bower Roller Bearings

PATHFINDER

THE MOTOR CAR MFG. CO.

MAKERS OF HIGH GRADE MOTOR CARS

INDIANAPOLIS, U.S.A.

May 5, 1915.

Bower Roller Bearing Co.,
Detroit, Michigan.

Gentlemen: Attention: Mr.D.F.Graham.

Your letter of April 27th at hand.

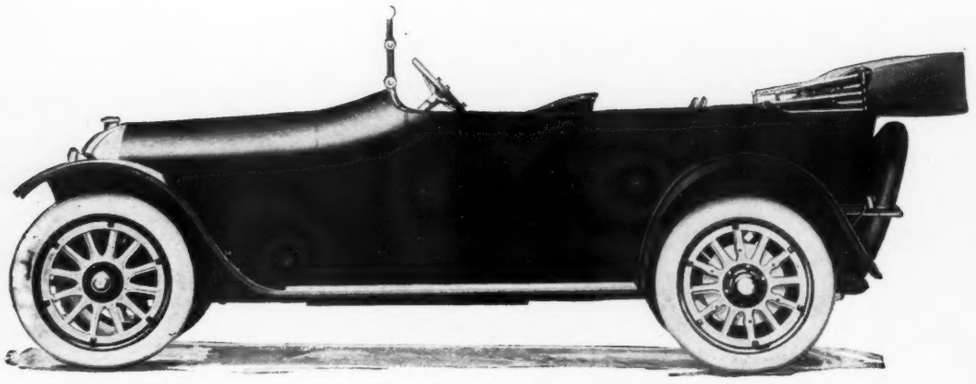
We are again using Bower Bearings in our wheels, simply because they have given satisfaction for two seasons on our cars.

We know by experience that we are absolutely safe in specifying your product.

Very truly yours,
THE MOTOR CAR MFG. CO.

Karl Feilke

KF-R Engineer.



Bower
Roller Bearing Co.
Detroit, Mich.

Write for complete information and list of users

BOWER SAVES POWER

BOWER SAVES POWER

You can build a reputation on SELDEN TRUCKS

When you sell a Selden Truck you sell a truck that will give permanent satisfaction to the buyer.

Selden Trucks are built for long, hard service. They possess greater built-in strength than other trucks of their capacity---because all their parts are larger and stronger and they are made of the best materials obtainable. Two models are offered:

The Worm-Drive Model

Capacity, 2 tons. Price, $2250

The Chain-Drive Model

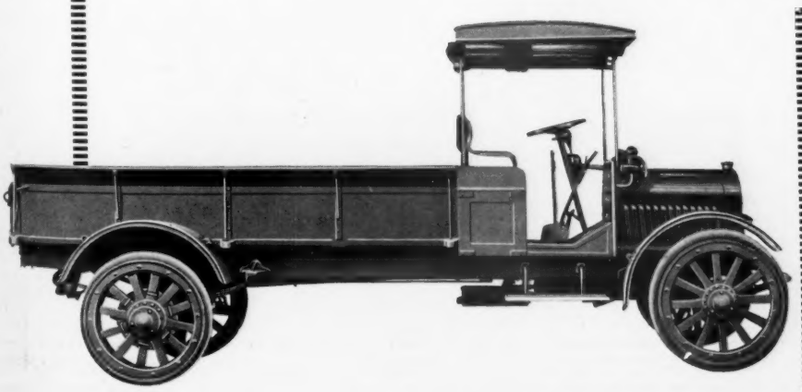
Capacity, 1½ tons. Price, $2000

The purchase of a Selden Truck is a paying investment.

Selden Trucks are easy to sell. Their price is low and they can be sold on our easy payment plan– pay for themselves while they are running.

The Selden proposition is an attractive one to the dealer. It would pay you to look into it.

Selden Truck Sales Co.
Rochester, N. Y.



SELDEN TRUCK SALES COMPANY
Rochester, N. Y.

Gentlemen:—I would like to know more about your proposition.

Name .....

Address .....

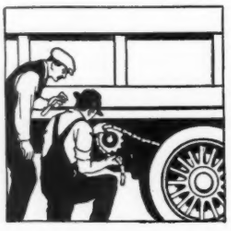
Town .....

State .....

Date.....

The Worm That Turned *or* Imitation is the Sincerest Flattery

CHAPTER ONE



The first experimental Pierce-Arrow motor truck was sent out for road tests in the spring of 1906. Four years of constant test and experiment convinced the Pierce-Arrow engineers that chain drive was unsuitable and inefficient for motor trucks. None of these experimental models, therefore, was ever offered for sale.

CHAPTER TWO

The Pierce-Arrow engineers then put a worm-gear truck in competition with their experimental chain-driven models. The result was so overwhelmingly in favor of the worm gear that this construction was adopted as standard for Pierce-Arrow motor trucks, and the experimental chain-driven models were scrapped.

CHAPTER THREE

The first Pierce-Arrow motor truck was sold in June, 1911, and this original introduction of the worm-gear drive in America made a sensation in the motor truck field. The construction was attacked on all sides by rival manufacturers and denounced as impracticable and inefficient.

CHAPTER FOUR

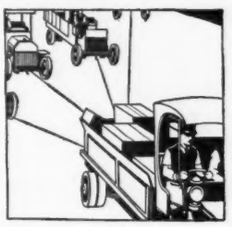
Pierce-Arrow worm-gear motor trucks soon began to make good in all kinds of service and under the most exacting conditions. The worm-gear drive was proved to be silent, efficient and economical. In 1912 rival manufacturers began to buy Pierce-Arrow trucks and study the worm-gear constructions.

CHAPTER FIVE

The first hastily constructed imitations of Pierce-Arrow worm-gear drive appeared on the market in 1913, and in 1914 a number of leading manufacturers adopted the worm gear for their entire line of trucks. Service records of Pierce-Arrow trucks had shown by this time that there was no perceptible wear in the worm gear after running over 100,000 miles. More and more repeat orders were received as a result of the favorable showing made by these pioneer worm-gear trucks.

CHAPTER SIX

The trend now became increasingly strong toward worm-gear drive. A general review of the motor truck shows of 1915 indicated that out of 213 accredited makers of gasolene commercial vehicles 25% were already using worm gear while many more were preparing to adopt it next year. Nearly 2,000 Pierce-Arrow worm-gear trucks in successful operation throughout the country now bear witness to the correctness of Pierce-Arrow design and constructions.



(*To be continued in 1916*)

Pioneers in Worm-Gear Drive

Prospective purchasers will find in this little sketch of recent motor truck history about as strong an argument as we can offer in favor of the Pierce-Arrow truck. If recent developments have convinced you that the worm gear is the most efficient and economical drive for motor trucks, it will surely be wise to purchase a truck which has long since passed the experimental stage and now embodies the results of four and one-half years actual working experience in many different kinds of service. Such a motor truck is the Pierce-Arrow—built by the pioneers in worm-gear drive in this country. We shall be glad to send to anyone interested a catalogue of Motor Trucks showing numerous body-types for 2-ton and 5-ton chassis.

The Worm-Gear

Pierce-Arrow Motor Car Co.

BUFFALO, N. Y.

Kelly-Springfield

Tires for Commercial Vehicles

For maximum mileage at minimum cost, equip your trucks with Kelly-Springfield sectional Block Tires on the rear wheels, and Kelly-Springfield Pressed-On or Demountable endless Tires on the front wheels. This is the ideal tire equipment for commercial cars. It will deliver record mileage even under unusually severe service conditions.

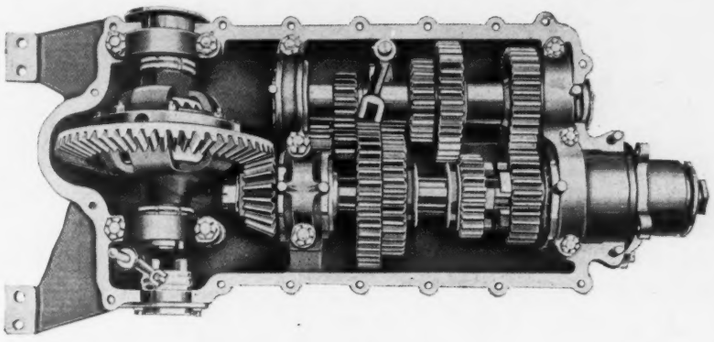
Kelly-Springfield Tire Company
Akron, Ohio
BRANCHES IN ALL PRINCIPAL CITIES

"The Spring Is the Thing"

MATHER SPRINGS

Scientifically Heat-Treated
Genuine made only by
The Mather Spring Company
Toledo, Ohio

WARNER
"THE RECOGNIZED STANDARD"



Enduring Service

Get this Maximum Service from your Truck
Insist on Warner high-grade transmissions

Detroit Office — WARNER GEAR COMPANY, MUNCIE, INDIANA — 967 Woodward Ave.

Warner Gear Co. Transmissions

TRUCK SPRINGS

There's a great difference in both the character and duration of service obtained from various makes of springs.

That difference is due to the quality of materials employed, the method of treatment, the equipment of the producing plant and the knowledge and workmanship involved.

THE SPRING PERCH COMPANY, ever since the inception of the automobile industry, has enjoyed an enviable reputation as the leading manufacturer of QUALITY SPRINGS, both for pleasure and commercial vehicles.

The company is equipped with furnaces of most recent and perfected models, affording absolute pyrometer heat control, and in the fabrication of SPRING PERCH CO.'S springs a unique and up-to-date equipment is employed, while thoroughly tested modern methods cover each operation.

Spring Perch Co., Bridgeport, Conn.

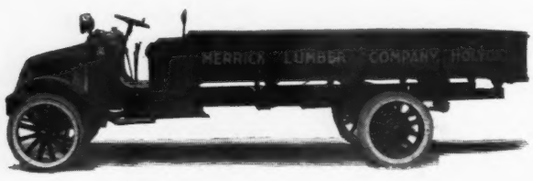
When Writing, Please Say—"Saw Your Ad. in the CCJ"

KREBS TRUCKS SELL FAST

The Krebs agency is a desirable asset to any live dealer. The trucks are exceptionally well built, have the highest grade parts, possess distinctive features, are adapted for nearly all kinds of truck work and have a reputation for giving economical service that helps close many a deal.

Among the parts which establish Krebs quality in the mind of purchasers are the Timken-David Brown Worm Drive, Continental Motor, Brown-Lipe Transmission, Bosch Ignition, Parish & Bingham Steel Frames, Timken Axles and Bearings and other standard units.

Krebs Model F, ¾ Ton

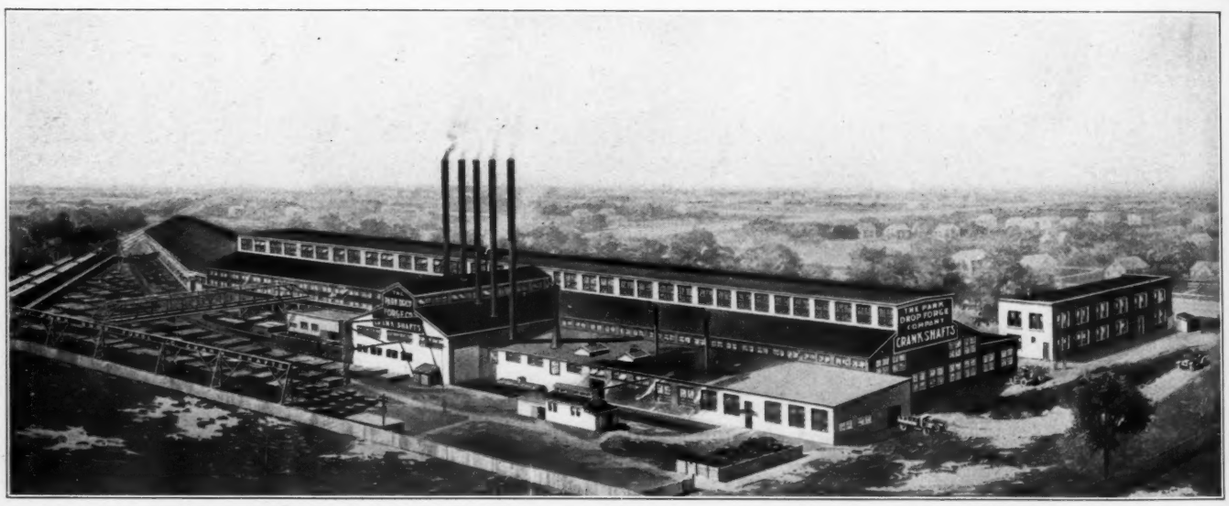


Model H, 2-Ton Truck

Add to these the wonderful Krebs Automatic Governor which compels the driver to get the utmost out of his truck with the minimum expenditure of fuel, thus producing an economy not possible with other trucks, and you have an array of selling arguments that will not be denied.

The Krebs line consists of 4 models—¾, 1, 2 and 3 tons capacities. Write for descriptive matter and dealers' proposition.

THE KREBS COMMERCIAL CAR CO., Clyde, Ohio



THE FIREPROOF HOME OF PARK CRANKSHAFTS

TRUCK AXLES—HEAVY DIE FORGINGS

CRANK DROP PARK FORGED SHAFTS

39 Large Hammers and Hydraulic Forging Presses, Chemical and Physical Laboratories, 16 Furnace Heat-Treating Plant

Large Stock Classified Steel—Analysis Checked in Park Laboratory

"Park Forgings" always have been guaranteed as to Chemical Analysis, Physical Properties and Bearing Hardness

CRANK DROP PARK FORGED SHAFTS

THE PARK DROP FORGE CO., CLEVELAND, OHIO

THE DOMINANT DRIVE

The transition from chain, bevel gear and other types of drive to worm drive has been so great that the latter is now the dominant drive in the truck field. It is found in nearly all the leading trucks and outnumbers all other types. This position has been obtained because the worm drive has proved its superiority to the other types.

We are the only exclusive manufacturers of worms and worm gears, we make more for automobile drives than any other maker, and we have the largest capacity for their production.

The Cleveland Worm & Gear Company

Cleveland, Ohio

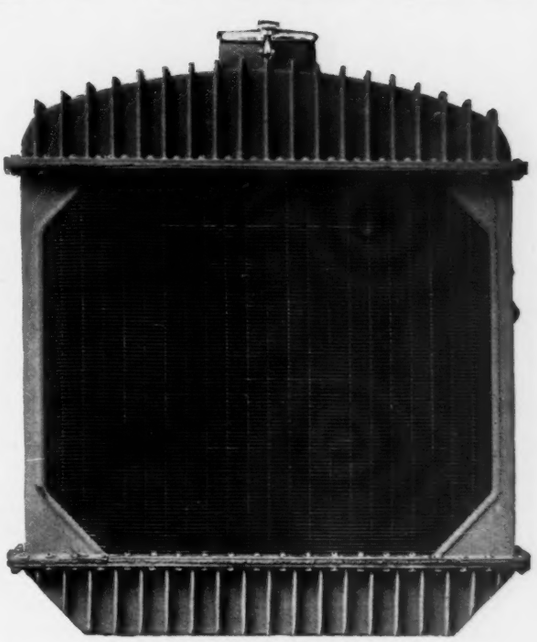
LONG COOLING SYSTEMS

CO-OPERATION with the engineering department of the best manufacturers of motor trucks and tractors has enabled us to develop and perfect many improvements which make our product the highest quality on the market and within a price that is more than consistent with same.

With our large, modern, fully-equipped plant and efficient organization we can guarantee production sufficient to meet the demands of the largest manufacturers and in accordance with our agreements.

Several types of Long Cooling Systems are made—Cellular, Flat Tube, Honeycomb, Spiral Tube, Fin and Tube

Write for catalog. Or—if you wish, we will gladly send our representative to confer with you relative to your radiation problem.



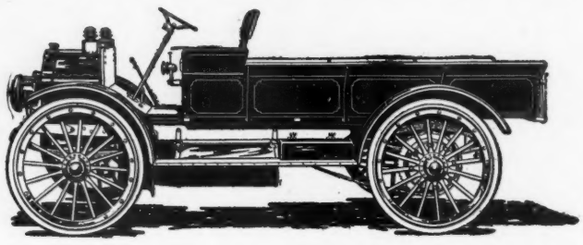
Tube and Plate Type for Truck Service

LONG MFG. COMPANY

DETROIT MICHIGAN

When Writing, Please Say—"Saw Your Ad. in the CCJ"

Buy an International Motor Truck



A light truck for speedy deliveries and light hauling is very probably what you will buy, because that's the kind of truck best suited to 80 per cent of business.

When you come to buy, whatever else you do, get a truck that is made and backed by responsible parties who are likely to stay in business until your truck is worn out. Find out these things about the truck you buy:

1. **Is it doing good work for firms in your line of business?**
2. **What kind of service can you get from the Company?**
3. **What is the Company's financial standing?**

You will get satisfactory answers to all of these questions when you ask about the

INTERNATIONAL MOTOR TRUCK

Model E, 1500 lbs. capacity **Model M, 1000 lbs. capacity**

It is doing good work for firms in nearly 200 different lines of business. Service on repairs and parts is the best in the country. There is no question about the Company's staying in business and taking care of you until the truck is worn out, even though it should last a lifetime.

There is no safer, better buy for you than an International Motor Truck. Write for catalogues and full information to

International Harvester Company of America

182 HARVESTER BUILDING **(Incorporated)** **CHICAGO U S A**

THE BUDA COMPANY
BUDA MOTOR
"The part to buy the car by"
ESTABLISHED 1891

We Thank You

You, good customers, have been generous with us during the past year. We have tried to be, this year as always, generous with you by putting into the BUDA MOTOR the very best that an organization of long experience and high reputation knows how to give.

We have not yielded to the temptation to force sales or to hasten manufacturing processes for the sake of large output. Your hearty and cordial recognition of this fact has, nevertheless, made us one of the world's leaders in quantity as well as quality.

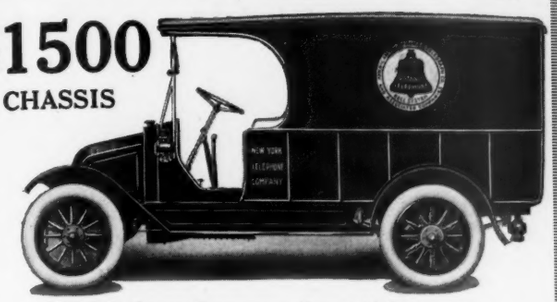
In April, 1915, we sold two and one-half times as many BUDA MOTORS to twice as many customers as in April, 1914, including, of course, motors for big and little trucks and big and little pleasure cars.

For your part in this great advance of ours please accept our earnest thanks.

The Buda Company, Harvey, Suburb of Chicago, Ill.

Stewart
Delivery Trucks

$1500
CHASSIS



Bell Telephone Company Owns 23 Stewarts

25,000 Miles Without Overhauling

Do you know of any delivery trucks that can cover 25,000 to 30,000 miles without being even overhauled?

Do you know of any delivery trucks that can operate for owners at an average repair parts cost of $1.37 a year?

These are records exclusively of Stewart Delivery Trucks—records that establish the Stewart as the most economical delivery truck on the market.

Here's still another record to which we may point with pride: 50 per cent of our business comes from concerns that have grown motor-wise on other delivery trucks.

And again this fact: One-third of our business is repeat orders. A repeat order means a satisfied owner.

Stewart Trucks are in service in 90 lines of business in 127 cities—here in America, in Canada, in South America—and everywhere they are more than making good. Write for our interesting booklet, "How Motor Delivery Pays."

Stewart Motor Corporation
Buffalo, N. Y.

(4)

How to obtain the cost of operating a motor truck

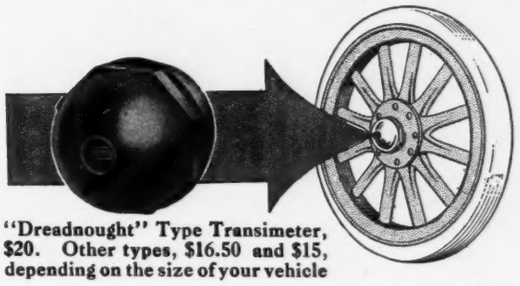
There is only one way to ascertain the cost of operating a truck or a fleet of trucks. That is to measure the mileage.

Measuring the Mileage

The best way to measure the mileage of any motor-driven vehicle is by means of one of the three types of the

TRANSIMETER

(the last word in Hub Odometer). Registers backward as well as forward movement.



"Dreadnought" Type Transimeter, $20. Other types, $16.50 and $15, depending on the size of your vehicle

Guaranteed Indestructible

The "Dreadnought" Type of Transimeter is indestructible and is so guaranteed. It is protected against collision or any accident.

Easy to Read

The figures are always horizontal. You do not have to read them sideways or upside down. No possibility of mistakes.

Grease- and Dirt-proof

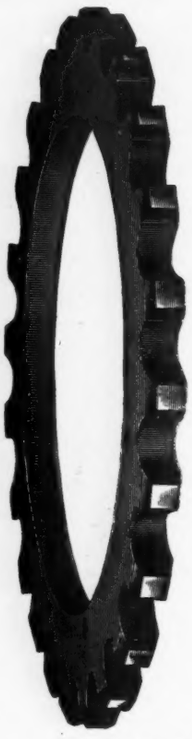
Care in construction prevents grease, dirt or oil from penetrating the glass window covering the instrument.

Write for Illustrated Booklet

It shows the Transimeter to be simple, accurate and reliable. It also shows the Recordograf—a tape recorder which gives **time, stops, speed and distance.**

See our Exhibit at the Panama-Pacific Exposition—Transportation Building

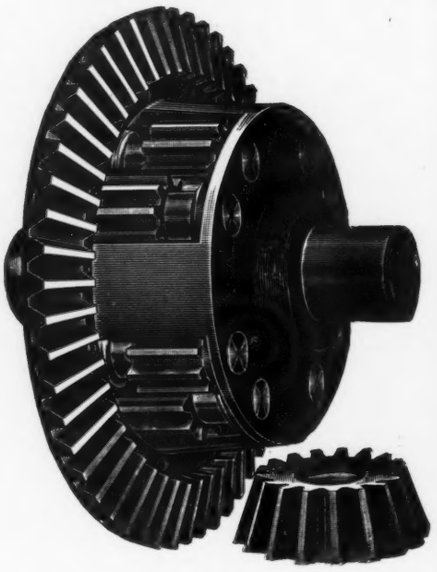
AMERICAN TAXIMETER COMPANY
Mfrs. of Jones and Popp Taximeters and the Recordograf
1416 Broadway New York City
Service stations in the following cities:
San Francisco New Orleans Washington Chicago Detroit Philadelphia Seattle St. Louis Boston



CULLMAN SPROCKETS and Differentials

in stock and to order.

Send for catalog and let us quote you on your requirements.



CULLMAN WHEEL COMPANY, CHICAGO
1351 GREENWOOD TERRACE

Veeder HUB ODOMETER

First Assistant to Your Cost Accountant

FORM K
$20

Accurate cost records are essential to the economical operation of your trucks. You cannot have such records, however, unless you first have a mileage recording instrument that is infallible.

That is the sound business reason why each of your trucks should be equipped with the VEEDER HUB ODOMETER. It can always be depended upon to give an absolutely accurate record of the mileage covered by the truck. It cannot be made to tell anything but the truth, and its records cannot be falsified without being instantly detected.

It is a necessary assistant to your auditor, because it gives him the precise information he needs upon which to base his cost reports, which shall determine whether or not your trucks are profitable. For your pocketbook's sake, investigate the VEEDER.

At your dealer's, direct from factory, or of the following:
T. H. CRANSTON & CO., 56 E. Randolph St., Chicago
BERNARD I. BILL, 543 Golden Gate Ave., San Francisco, Cal.

The Veeder Manufacturing Co.

C. H. VEEDER, President **D. J. POST, Treasurer**
H. W. LESTER, Secretary
Hartford, Conn.
Makers of Cyclometers, Odometers, Tachometers, Tachodometers, Counters and Small Die Castings

Put a Punch in Your Motor

With

LEAK-PROOF PISTON RINGS

MADE BY McQUAY-NORRIS MFG. CO.

THEY secure perfect compression of each fuel charge and the utilization of the whole force of the succeeding power impulse. They also prevent impairment of valve action by carbon caused by surplus lubricating oil getting up past worn or imperfect piston rings into the combustion chamber of the cylinder.

The patented two-piece, angle-to-angle interlocking construction is the exclusive LEAK-PROOF design—absolutely essential to true leak-proof service. It is the only mechanical principle by which exact fit, equal and enduring tension of a piston ring can be obtained. Look for this feature—identify the LEAK-PROOF Ring—insist on it when you order.

Sold by all up-to-date supply houses, garages and repair shops

McQuay-Norris Mfg. Co.
Dept. C St. Louis, U. S. A.

Canadian Factory:
W. H. Banfield & Sons
120 Adelaide Street West Toronto

BRANCH OFFICES:
New York: 1919-29 Broadway at 64th St.
Pittsburg: 902 Second Nat. Bank Bldg.
Kansas City: 513 New Nelson Building
Chicago: Suite 718 Michigan Blvd. Bldg.
San Francisco: 164 Hansford Bldg.
Los Angeles: 224 Central Bldg.
Dallas: 509 Juanita Building
St. Paul: American Nat. Bank Bldg.

Ask the User

In use on over 300,000 motors

Free Book
"To Have and to Hold Power"
Send for it today

Saves 15% on Auto Insurance

So well satisfied are the Insurance Companies with the QUALITY of fire protection furnished by PYRENE, that they have made this reduction in the cost of a policy on a Pyrene protected car—the Aetna Accident and Liability Company and the Automobile Insurance Company, of Hartford, Conn., having led the way.

The motor and aircraft equipment of the British Army and Navy is provided throughout with Pyrene.

Hardly an hour passes, without an automobile or a garage being saved, *somewhere*, by a Pyrene Fire Extinguisher.

Despite the greatest care, explosions and fires are caused by gasoline and grease.

Pyrene extinguishes such flames before they spread, and does not injure the most delicate engine parts, the finish or upholstery.

The extinguisher harmonizes with the finest type of dashboard equipment.

See Pyrene display in Palace of Machinery at Panama-Pacific Exposition

Brass and Nickel-plated Pyrene Fire Extinguishers are included in the lists of Approved Fire Appliances issued by the National Board of Fire Underwriters, and are Inspected, Tested and Approved by, and bear the label of, the Underwriters' Laboratories, Inc.

Write for booklet, "The Vital Five Minutes"

PYRENE MANUFACTURING CO., 52 VANDERBILT AVE., NEW YORK

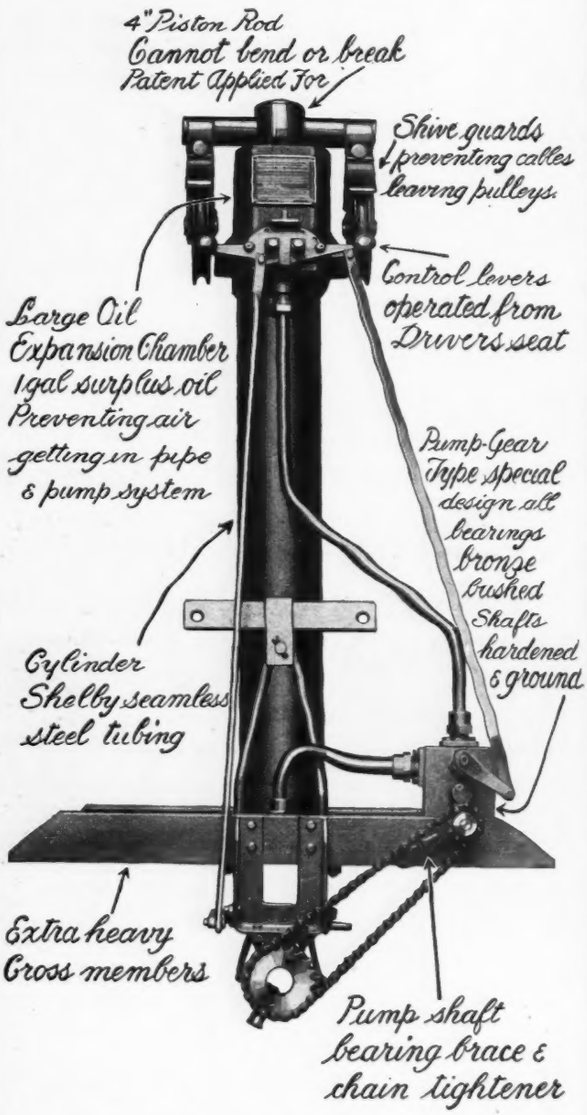
California Distributors: Gorham Fire Apparatus Co., San Francisco, Los Angeles
Distributors for Canada: May-Oatway Fire Alarms, Ltd., Winnipeg
Distributors for Great Britain and The Continent: The Pyrene Co., Ltd., 19-21 Great Queen St., London, W. C.

THE **WOOD**

Hydraulic Hoist

Solves the Dumping Problem for

Motor Dump Trucks


4" Piston Rod
Cannot bend or break
Patent Applied For
Shive guards preventing cables leaving pulleys.
Control levers operated from Drivers seat
Large Oil Expansion Chamber 1 gal surplus oil Preventing air getting in pipe & pump system
Pump-Gear Type special design all bearings bronze bushed Shafts hardened & ground
Cylinder Shelby seamless steel tubing
Extra heavy Cross members
Pump shaft bearing brace & chain tightener

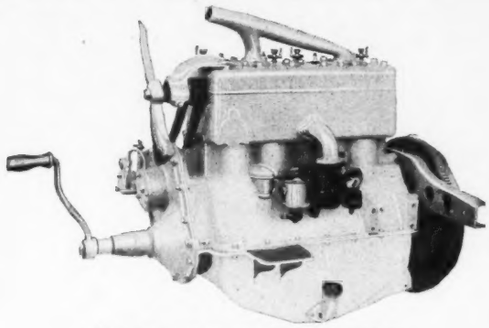
Improved Heavy-Duty Type "D" Hoist

"Made in Detroit Only"
by the

Wood Hydraulic Hoist & Body Co.
560 Franklin Street DETROIT, MICH.
Successors to
Wood Hydraulic Hoist Company, St. Paul, Minn.

THE **RUTENBER MOTOR**

This new Model 20 is an ideal motor for light capacity trucks



Model 20, 3½ x 5, 4 cyl.—30-35 H. P.
For Trucks of ½-1½ Ton Capacity

This is a 1915 product designed especially to give a high-grade, dependable motor at low cost in quantities, for commercial cars. It is an efficient high-speed motor with extra large bearing surfaces, plain and simple design, strong, durable and possessing characteristics most desired in this kind of service. Write us for complete information.

The Rutenber Motor Company
Marion - - Indiana

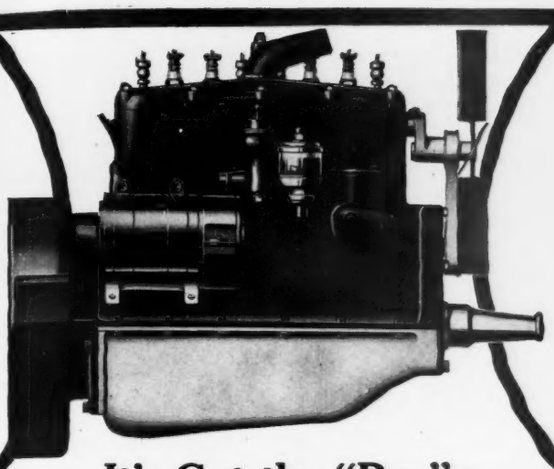
B-A-Gramm's Trucks

appeal to the man who has had experience in the use of motor trucks.

To him their quality points, the individual clutch transmission, guaranteed springs, self-starter, etc., mean a definite saving in operating costs.

The full line, 1 to 6 tons, with all its features, is described in our complete catalog, which will be sent you on request.

THE GRAMM-BERNSTEIN COMPANY
Dept. 1 LIMA, OHIO, U. S. A.



It's Got the "Pep"

that conquers mud, sand and hills, that makes it stand up to the hard grind of truck work, day after day, week after week, month after month. It's a

Wisconsin
CONSISTENT

Truck Motor, and it's got a reputation to sustain. Every Wisconsin Motor has behind it a long record of consistent performance. Write for illustrated catalog.

WISCONSIN MOTOR MFG. COMPANY
Sta. A, Dept. 233 Milwaukee, Wis.

BESSEMER TRUCK

Illustration shows Model "C" which is equipped with either pneumatic or solid tires. There is more real sturdiness built into this than in any other one-ton truck on the market.

Three Models

MODEL C	MODEL A	MODEL D
1 Ton Capacity	1½ to 2 Ton Capacity	1½ to 2 Ton Capacity Worm Drive
25 H. P.—$1250	30 H. P.—$1800	30 H. P.—$2300

DEALERS: Write us about the special proposition we have for you. The Bessemer line enables you to handle every truck requirement.

BESSEMER MOTOR TRUCK CO.
GROVE CITY, PA.

PLAIN COMPRESSION
(Patented)

Empress

BRASS AND STEEL

GREASE AND OIL CUPS

WE MANUFACTURE
a full line of Plain, Leather Packed, Ratchet, Marine, Spring Compression, and many other styles of Grease Cups.

Our line of Oil Cups is equally satisfactory and complete.

Catalogue on Application

SPRING LOCK
(Patented)

Bowen Manufacturing Co.
AUBURN, N. Y.

LAVIGNE STEERING GEARS

The Peer of Gears
For quality Motor (cars) (trucks)

We are Steering Gear specialists.

We command the largest percentage of the Steering Gear business.

All of our product is made of the highest grade materials, all working and wearing parts made from alloy steels, pack hardened, water and oil treated, ground to gauges. Insuring interchangeability, easy steering and irreversibility.

The Value is honest
The Judgment expert
The Sale sincere

Write for detailed information.

LAVIGNE GEAR CO.
Racine - - Lock Box 324 - - Wisconsin

The United Line

DEALERS—
"Unite With
The United"

2 ton Worm-Drive Truck - -	$2250
3½ ton Worm-Drive Truck - -	2900
3 ton Chain-Drive Truck - -	2750
5 ton Worm-Drive Truck - -	3400

Nothing Experimental—
Nothing Obsolete

Continental Motor
Eisenmann Magneto
Stromberg Carburetor
Mayo Radiator

Brown-Lipe Transmission
Spicer Drive Shaft
United Factors
Structural Steel Frame
Yale-locked Speed Governor

Perfection Springs
Timken Axles
Timken Bearings
Gemmer Steering Gear

UNITED MOTOR TRUCK CO. Grand Rapids Michigan

A LEAKY TANK
IS BOTH A MENACE AND AN EXPENSE

—a menace to life and property, because of the danger of fire or explosion it engenders—an expense, because it does not give you the use of all the gasoline you pay for.

You can be positive of getting full service, long life, and real property and life insurance by equipping your car with the

"JASCO TANK"

"JASCO" SAFETY FIRST TANKS

the drawn-steel, seamless, leakless, tinned and tested gasoline tank that protects life and property. All styles, all sizes, at your dealer's, or direct.

JANNEY, STEINMETZ & CO.
MAIN OFFICE: PHILADELPHIA
NEW YORK OFFICE: HUDSON TERMINAL BUILDING

GEARS

For every kind of service where quality is paramount.

Van Dorn & Dutton superiority rests on these six points:

We know by experience
We produce in quantity
We manufacture complete
We machine complete
We cut only to specifications
We deliver on time

See that the Van Dorn & Dutton

Quality Mark

is on your gears and complete differentials.

Write us today

THE VAN DORN & DUTTON CO.
GEAR SPECIALISTS
NEW YORK CLEVELAND SAN FRANCISCO

ESTABLISHED 1909 INCORPORATED 1914

SIX YEARS OF SUCCESS

The United States Motor Truck Co.
Cincinnati, Ohio

OFFERS A FINE OPPORTUNITY TO DEALERS

GET OUR PROPOSITION

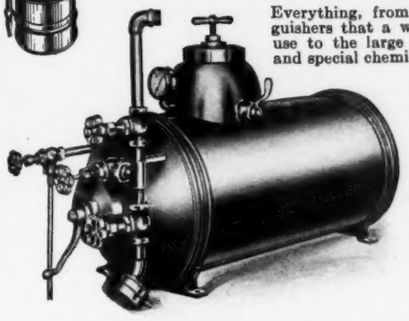
Made in
2, 2½, 3 and 4 ton
Capacity

THE correctness of its construction combined with best quality materials and right prices, make the U. S. a splendid value for buyers and a good proposition for dealers.

Address Contract Dept. A.

SPECIFICATIONS AND PRICES ON REQUEST

DEPENDABLE Chemical Fire-Fighting APPARATUS



Everything, from the hand extinguishers that a woman or child can use to the large Chemical Engines and special chemical tanks for Fire Department service.

Into each is put material and workmanship that cannot be excelled. Designs are shown by actual use to be beyond improvement.

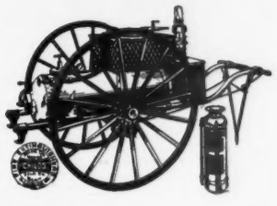
Result: Perfect and immediate action when needed, no deterioration from lack of use or age.

All Our Tanks Are Made of Copper

The name "CHILDS" stands for perfection.

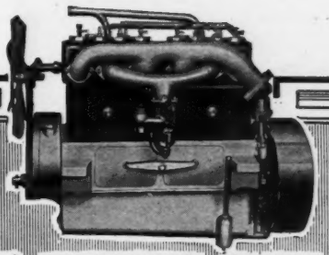
Chemical Tanks for Fire Department or other service made to order.

Write for our Complete Catalogue and interesting talk on Fire Apparatus.



O. J. CHILDS CO., Utica, N. Y.

MANUFACTURERS FIRE APPARATUS



WAUKESHA

4¼×6¾ LONG STROKE TRUCK MOTOR

EFFICIENCY is the Waukesha Motor's best eulogy. It is efficient because it is constructed to give the utmost in service.

The Waukesha crankshaft has a tensile strength of 70 tons. The bearings have three times the wearing quality of ordinary bearings. Both these metals are our own processes. The rest of the motor is on par with these two features. When we can prove all this, why not ask us to?

Why not learn that you can put a motor in your trucks that will *exceed* your broadest guarantee of efficiency, wear, and economy of fuel? Your request will bring proof that will leave no doubt of the Waukesha Long-Stroke Motor's supremacy.

WAUKESHA MOTOR CO.

WAUKESHA Dept. A. WISCONSIN

AN EXCEPTIONAL MOTOR

What a Troy Trailer Does For The Saxon Motor Company

The Saxon Motor Company of Detroit used to haul 15 complete sets of axles and transmissions on a 1½-ton truck; with a Troy Trailer they now haul 43 sets at no additional cost. The load of frames has been raised from 22 with the truck alone, to 55 with the Trailer. The average daily tonnage has been raised from 3,150 lbs. to 17,421 lbs.

Pay load has been increased 200 to 400 per cent without appreciably affecting operating expense. Send for Troy Trailer Booklet 4-CCJ.

The Troy Wagon Works Company

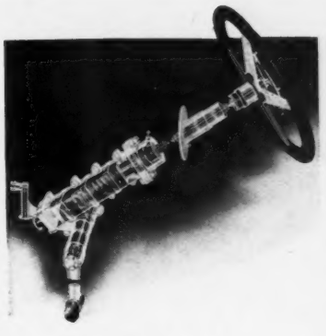
Troy, Miami County, Ohio

New York	Detroit	Washington, D. C.	London, England
50 Church St.	319 Hammond Bldg.	505 Riggs Bldg.	49 Pall Mall

Troy Trailers

ROSS Steering and Differential GEARS

will help sell your trucks



They are STANDARD on good motor truck construction

INVESTIGATE

our new complete line of fore and aft steering gears

Enormous bearing surfaces
Perfect lubrication
Best material throughout
Finest workmanship

Built in the largest and newest steering gear factory in the United States.

WRITE FOR CATALOG

ROSS GEAR & TOOL COMPANY

790 Heath St. :: Lafayette, Ind.

G. V. ELECTRIC TRUCKS

SIX MODELS: 1,000 POUNDS TO 5 TONS

Over 4,000 in use
Catalog on request

General Vehicle Company, Inc.

GENERAL OFFICES AND FACTORY:
LONG ISLAND CITY, NEW YORK

NEW YORK::CHICAGO::BOSTON::PHILADELPHIA

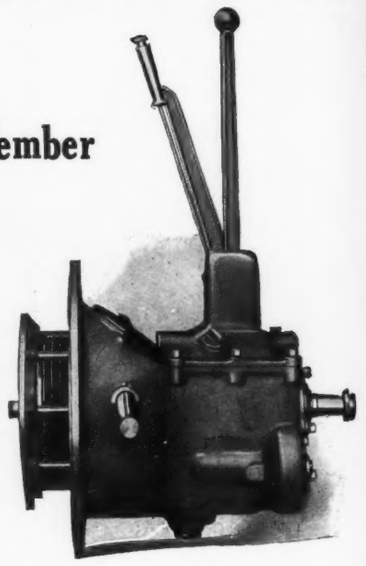
2603

FULLER Transmissions

Types:

Unit
Cross-Member

Nickel Gears
Ball Bearings
Dry Disc Clutch
Center Control



Trucks
¾ to 2 Tons
2 Sizes

Complete details on request

FULLER & SONS MFG. CO.
KALAMAZOO, MICH.

A Shim Is—

As Necessary as a Wrench

Motor truck service is hard. Bearings frequently require adjustments. Shims are thus as necessary in the shop as a wrench. Make your shims from

LAMINUM
the MATERIAL for SHIMS

and you'll save time, trouble, labor and expense. Don't waste time filing a solid shim! Don't fool with troublesome loose-leaf shims! Don't waste money on new shims! Be economical. Be practical. Save time, labor, expense. Use LAMINUM! It's the work of a moment—just peel off with your knife enough of these .002" laminations to get the desired thickness. Result—a smooth surface, uniform thickness, perfect adjustment, an unspoiled bearing surface—a first-class job with little work or cost.

LAMINUM comes in various forms and thicknesses. We put up a trial assortment that will just suit you. Write for prices and data.

Laminated Shim Company, Inc.
539-41 Canal Street - New York

SCHWARZ WHEELS

Patented Aug. 25th, 1904

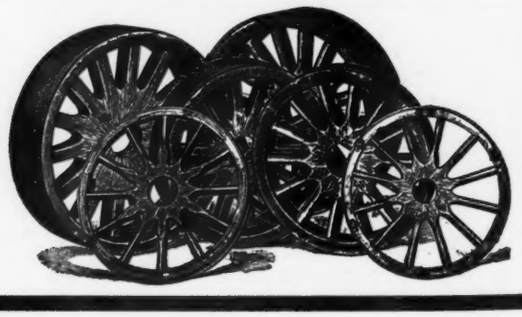
Used by the makers of most quality trucks, because they offer the utmost in strength, safety and economy.

Desired by truck buyers, because they are a known product whose superiority has been conclusively demonstrated.

Wanted by dealers, because they are an assurance of quality and make a truck easier to sell.

"Bear the Burden"—a booklet—will tell you why this is so—send for it.

The Schwarz Wheel Co.
Frankford Philadelphia Penna.



The Pierce Speed Controller Company is pleased to announce that

MR. B. G. KRAMER

formerly associated with the Kramer Governor Company, is now affiliated with its organization.

PIERCE SPEED CONTROLLER COMPANY
Anderson, Indiana, U. S. A.

"The World's Largest Governor Builders"

You Will Avoid Expensive Delays

if your motor trucks are equipped with

TUTHILL TITANIC SPRINGS

NO CENTER BOLT

Best for Worm Drive Construction

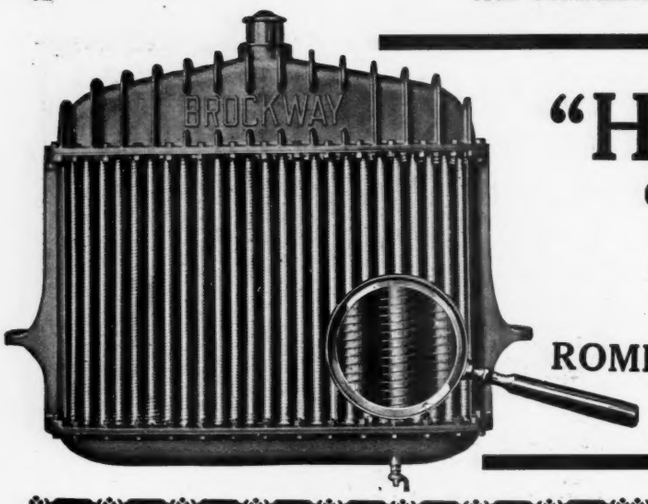
Recommended by Engineers

Engineers are recommending the Tuthill Titanic No-Center-Bolt Spring, because the additional stress of the Worm Drive Construction will cause the center bolt in the ordinary spring to shear off and break in the center. They eliminate the possibility of center breakage and all center motion.

Write today to our Engineering Department for "Facts about Motor Truck Springs."

Guaranteed forever against center breakage

Tuthill Spring Co., 774 Polk St., Chicago, U. S. A.



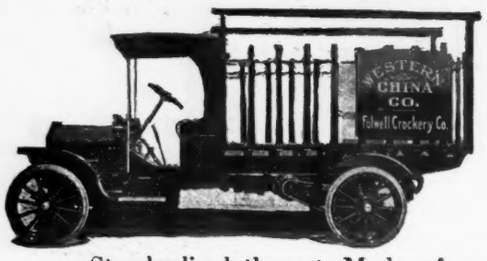
"HELICAL TUBE"

Cooling Sections are guaranteed for the life of the motor on which they are installed.

Manufactured only by

ROME-TURNEY RADIATOR COMPANY

JASPER STREET ROME, NEW YORK



DEALERS, ATTENTION!

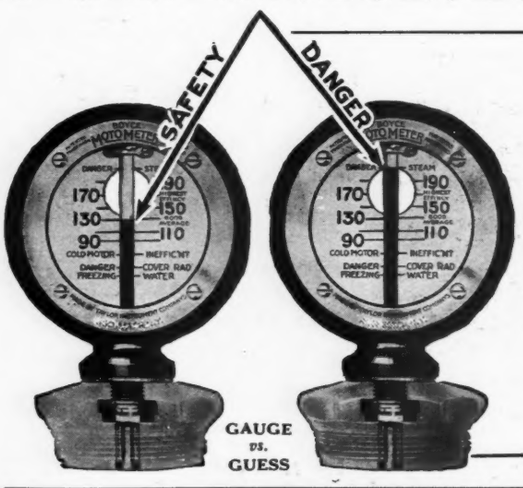
MODERN

THE BOWLING GREEN MOTOR CAR COMPANY

TRUCKS FOR 1915

Standardized thruout, Modern from radiator to tail lamp, built in chain and worm-drive models. Just the truck to get the business in your territory. *Live dealers should write for catalog.*

THE BOWLING GREEN MOTOR TRUCK CO., Bowling Green, Ohio



Why Packard Trucks Have Adopted as Standard Equipment

Boyce MotoMeter

The Radiator Heat Indicator

In the past, your drivers have perhaps trusted to "guess" to tell them when the radiator water is low; when their oil supply is insufficient; when a fan belt breaks, etc., but a Boyce MotoMeter will warn the driver miles in advance of these conditions, insuring the truck against motor damage.

During the cooler months over one-third of the gasoline can be saved by operating the motor at proper heat. Write today for full particulars.

THE MOTOMETER COMPANY 1790 BROADWAY NEW YORK CITY

STANDARD RUNNING BOARDS

22" x 9" x 6¾"

Like the STANDARD TOOL AND BATTERY BOXES

Are Made of the Best Material and Workmanship. Send us your Blue Prints and Specifications for our quotations

STANDARD STEEL BOX COMPANY BRIDGEVILLE, PA.

ROWE
MOTOR TRUCKS

are used in every line of business and in every case have proved the most economical means of hauling.

A Rowe Truck will save you money in transporting your merchandise.

The Rowe Truck is guaranteed to give

Continuous Economical Operation

Worm or chain drive. One to five tons capacity

Rowe Motor Manufacturing Co.
Downingtown, Pa.

RYERSON REINFORCED
GLYCO PATENTED SKELETON CONSTRUCTION
BEARINGS

for automobile, motor boat, tractor and stationary gas engines and other machinery where a removable and quickly replaceable bearing is desired.

Finished Bearing

A reinforced Babbitt bearing embodying enormous **strength** and **resistance.** A steel or bronze skeleton embedded in the Babbitt changes weakness to strength — just what steel reinforcement does to concrete.

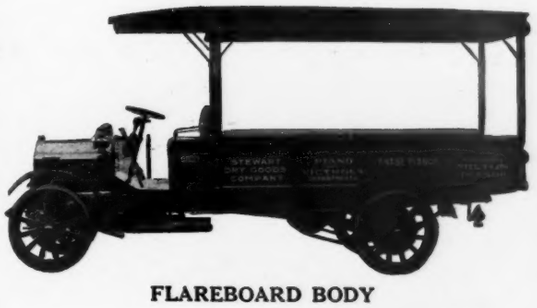
Section showing reinforcement

Reinforced and interlocked throughout body and flanges —skeleton and Babbitt one homogeneous mass.

Demand Ryerson Reinforced Bearings in those vital parts of your engine—the connecting rod and main shaft bearing. The whole engine is no stronger than its weakest part. Inferior bearings make an inferior engine.

Steel or bronze skeleton, used in combination with whatever Babbitt metal is preferred.

JOSEPH T. RYERSON & SON
Iron Steel Machinery
Chicago New York St. Louis



FLAREBOARD BODY

INSURE AGAINST UPKEEP COST

BE CERTAIN

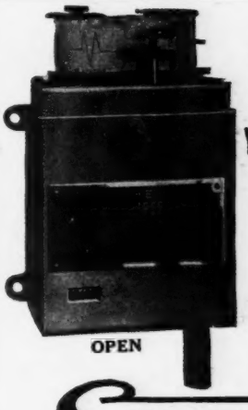
Unless the manufacturer, dealer or user of a truck body is certain that high-class workmanship is in every item of its construction, somebody's dollars are being wrongly invested.

A Highland Commercial Body is an economy, because it stands up against hard road shocks and outlives cheaper bodies.

Highland Bodies are shipped "set up", in prime or painted, and ready with all equipment for immediate and easy attaching to chasses.

Get Our Catalog

The Highland Body Manufacturing Company
608 Elmwood Place
Cincinnati - - Ohio



Mr. Truckowner:

YOU ought to KNOW
YOU can't afford to GUESS

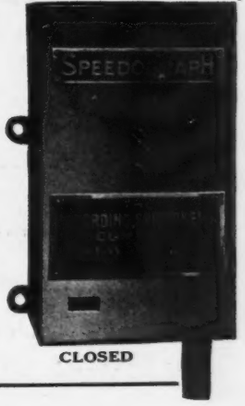
what your trucks and chauffeurs are doing all the time—every day.

OPEN

THE

SPEEDOGRAPH

TELLS



It is accurate, strong, dependable, guaranteed. Get 100% efficiency for a 2% to 5% addition to your truck investment. It is dollars for cents to you.

Let us tell you about it.

THE SPEEDOGRAPH SALES CORPORATION
24 State St. New York City

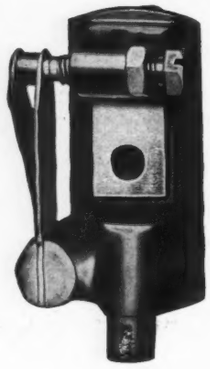
EISEMANN

It is in the make-and-break mechanism that unquestionably the greatest simplicity in this new model is to be found.

The new make-and-break is of the spring type rather than the rocking lever type and is another exclusive patented Eisemann feature. Being of the spring type, the parts are very light, so that no noise is produced in the opening and closing of the contacts.

Because in its action of opening and closing the circuit the contact spring rides or glides over the round fibre cams with a sort of rolling motion, wearing of the contacts is substantially prevented—a condition which is emphasized in other types of make-and-break, where a hammering effect is produced in the opening and closing of the contacts. As in our other types of high-tension magnetos, this make-and-break mechanism is held in a fixed relation to the armature by means of the usual key and keyway.

New Type G-4 Make-and-Break Mechanism



Make-and-Break Mechanism. Note the simplicity of the entire unit.

The Eisemann Magneto Co.
Sales and General Offices
32-33d St., Brooklyn, N. Y.
New York, 245 W. 55th St.
Indianapolis, Ind., 415-417 N. Capitol Ave.
Detroit, Mich., 802 Woodward Ave.

Philadelphia
THIN PLATE BATTERIES
"Diamond Grid"

CAPACITY ECONOMY LIFE MILEAGE

DIAMOND GRID TRADE MARK

For Pleasure and Commercial Cars
For Sparking, Starting and Lighting

WRITE FOR CATALOGUE

Philadelphia Storage Battery Company
ONTARIO AND C STREETS
PHILADELPHIA, PA.

DEPOTS AND AGENCIES:

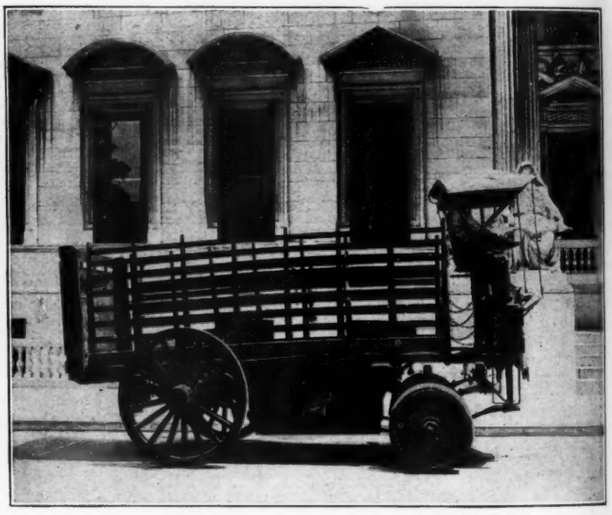
NEW YORK	BOSTON	ROCHESTER
WASHINGTON	DENVER	SALT LAKE CITY
DETROIT	BUFFALO	CLEVELAND
MINNEAPOLIS	KANSAS CITY, MO.	ST. LOUIS
TORONTO	SEATTLE	CINCINNATI
OAKLAND	CHICAGO	PORTLAND, ORE.
SAN FRANCISCO	LOS ANGELES	SACRAMENTO

The Latest Type
Wood Hydraulic Hoist

made to fit any chassis. Will dump a load in thirty seconds. Great time saver in hauling coal and building material.

Write for our descriptive booklets and prices

Hydraulic Hoist Mfg. Co.
172 West Fifth Street Saint Paul, Minn.
Original builders and successors to Wood Hydraulic Hoist Company



Boston, Mass.

Gentlemen:

We have your letter of the 16th inst. in relation to the "Couple-Gear" truck used by this Company, and would state, we have been using one for a period of over two years and it has worked out very satisfactory, so much so that we purchased a second one and I believe our New York Office has since that time purchased either two or three. We use the two wheel drive with battery, as it answers our purpose very well and the tire expense is minimum in our opinion.

Yours truly,
NATIONAL FIRE PROOFING CO.
Walter M. Evatt, Vice-Pres. and Mgr.

This economic type of wagon is saving money for others, why not for you? Let us tell you more about it.

COUPLE GEAR FREIGHT WHEEL COMPANY
420 Buchanan Ave., Grand Rapids, Mich.
Boston, 179 W. 1st St. New York, 30th St. and 11th Ave.
Philadelphia, 522 Weightman Building

DENBY

Motor Trucks

Realizing that each business presents its own peculiar delivery and haulage problems, the designers of the Denby have tried to make it, so far as possible, a "made-to-order" truck for each user.

There are four models—¾ ton to two tons. Each model is susceptible of chassis and wheelbase modifications which enable it to give "made-to-order" service in almost any line.

Instead of readjusting the business to fit the truck, the truck itself is adjusted to the business.

Denby Motor Truck Company
38 Dubois Street, Detroit, Michigan

WHAT ABOUT LIGHTS
and Starting Motor
ON YOUR TRUCKS?

How Do You Know When They Will Fail You?

Don't Take Chances!

Weston
(Model 354)

AMMETER

On Your Dashboard or Cowl

will keep you posted every minute regarding the recharging or discharging of your storage battery. It gives you warning of approaching trouble. Its exact information is invaluable — the cheapest and best insurance you can buy.

Write for full information, which will show you plainly the risk you run in operating the electric plant on your truck or car without a Weston measuring instrument.

WESTON ELECTRICAL INSTRUMENT CO.
22 Weston Avenue, Newark, N. J.

New York	Chicago	Boston	Detroit	Philadelphia
Cleveland	Buffalo	Cincinnati	San Francisco	St. Louis
Richmond	Denver	Toronto	Winnipeg	Montreal
Vancouver	Berlin	London	Paris	Petrograd

Spicer Universal Joints

Universally Accepted as the Most Dependable Flexible Connection Known to Motor Car Practice

Oil-Tight Dust-Proof

PARTS INTERCHANGEABLE

Spicer Manufacturing Company
Plainfield, N. J.

Sales Representatives:
K. Franklin Peterson, 122 S. Michigan Blvd., Chicago
L. D. Bolton, 2215 Dime Savings Bank Bldg., Detroit
Foreign: Benjamin Whittaker, 21 State Street, New York

DIXIE 20TH CENTURY MAGNETO

The nature of the spark from a high-tension magneto just *penetrates* the mixture. The waste of heat units in slow-burning battery-timer sparks is utterly impossible with the

20th Century DIXIE

SPLITDORF Electrical Co.
NEWARK, N. J.

(All SPLITDORF features are fully covered by patent or patents pending)

Stegeman

PRICES REDUCED
—ON—
STEGEMAN TRUCKS

Never before has it been possible to obtain trucks of this high quality at such low prices.

Specifications same as before: Continental motor, Brown-Lipe gears, Timken bearings, multiple disc clutch, Stromberg carburetor, Eisemann magneto, *guaranteed springs, etc.—all "The World's Best Units."* Simplest, Strongest and Easiest riding trucks for their capacities, on the market.

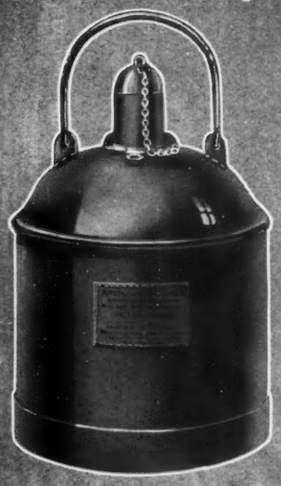
A reduction of $200 to $350 from old prices—

1 -ton - - -	$1600.00
1½-ton - - -	1900.00
2½-ton - - -	2500.00
3½-ton - - -	3000.00

Send for descriptive literature and *you* be the judge of the value.

Stegeman Motor Car Co., MILWAUKEE WISCONSIN

McNUTT NON-EXPLOSIVE GASOLINE CANS



SAFEGUARD YOUR GARAGE

Don't run the risk of fire or explosion caused by gasoline kept in ordinary cans. Neither can happen if you have McNutt Cans, for they are so constructed that a lighted match can be applied to them without danger. Will outlast 20 ordinary cans.

McNutt Cans are used by many of the largest makers and users of trucks, with absolute satisfaction. They will serve you equally well. Write for description and prices.

John C. Eames, Inc.
320 Broadway, New York.

Baker Electric Trucks

are in service in 98 distinct lines of trade in as many different cities located in the United States, Canada, Alaska, England, France, Porto Rico, South America, South Africa, Siam, Japan and Australia. Our Truck catalog shows many of these trucks and gives interesting figures on what they have actually done. May we send it to you?

Capacities: one to five tons.

Body designs to meet any requirement.

The Baker R. & L. Co.
Cleveland

One of six Jeffery Quads in the service of the United States Army Signal Corps. This is the most powerful portable wireless station in the world. The Jeffery Quad drives, brakes and steers on all four wheels.

The Thomas B. Jeffery Company
Main Office and Works, Kenosha, Wisconsin

$2750 is the price of the New Standard 3½-ton Standardized Truck, which combines more standard parts than any other truck;

such as Continental motors (with automatic governor), Brown-Lipe transmission, Timken axles, Gemmer steering gears, Timken bearings, Stromberg carburetor, Eisemann magneto, Spicer universal joints, etc., all superior parts that appear in standard construction, which are the surest proofs of absolute quality.

It will pay live agents to investigate.

STANDARD MOTOR TRUCK CO.
DETROIT, MICH.

BUCKEYE Motor Truck Jacks

Buckeye Motor Truck Jacks are safe, reliable and made to stand the wear and tear for which they are intended. They are fully guaranteed, and cannot possibly drop with a load. They are made from Steel Drop Forgings, best finish and workmanship throughout.

Get our prices before you place your orders for jacks, we can save you money.

No.	Height Bar Down	Raise of Bar	Height Bar Up	Weight	Capacity		List Price
7	11¼″	6½″	18″	16 lbs.	2½ tons	with formed handle	$10.00
13	14¼″	7½″	20½″	26½ "	3 "		15.00
14	14¼″	7½″	20½″	33 "	5 "		16.00
9	11½″	6″	17½″	10 "	1½ "		6.00

Write today for descriptive catalog. Made only by

THE BUCKEYE JACK MFG. CO., Alliance, Ohio

CRAMP BUSHINGS

Bushings, of all things, should be of proven quality. Truck Builders who aim to build faultless service and long life into their cars take no chances, they use CRAMP BUSHINGS, made of the famous Cramp Special Bearing Bronze.

Cramp Bushings have highest compressive strength and real anti-friction qualities. We are prepared to furnish bushings machined complete, ready for installation or the ingots and rough castings as you may desire.

Endow your car with the Cramp reputation by specifying Cramp Special Bearing Bronzes. Write us about it.

WM. CRAMP & SONS SHIP & ENGINE BUILDING CO., Philadelphia, U. S. A.

FRAMES

THE PARISH & BINGHAM CO.
CLEVELAND, OHIO

Our Entire Engineering Force is at Your Disposal

New
½ Ton
Model

Built Like a Truck for Economical Service

Light, fast delivery car; worm-drive; special spring suspension; Dyneto Electric Lighting and Starting System with Willard Storage Battery.

A light car built, not to meet competition, but to satisfy Lippard-Stewart Quality

Radiator at Dash
Our Dealers' Sign

Lippard-Stewart MOTOR TRUCKS

½ Ton, ¾ Ton, 1 Ton, 1½ Ton, 2 Ton

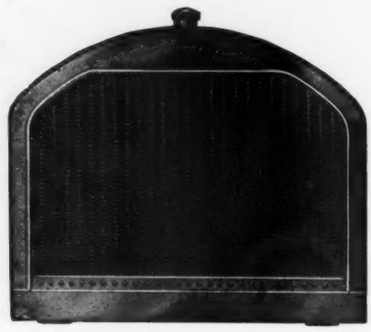
A Size for Different Requirements Makes the Best Line for a Good Dealer

Write Today for Catalog

Lippard-Stewart Motor Car Company
237 W. Utica Street Buffalo, N. Y.

CANDLER TRUCK RADIATORS

Thoroughly Reinforced



Unusual Strength—High Efficiency

The Candler Special Truck Radiator is the strongest construction on the market to-day. It is highly adapted to truck use, by virtue of its efficiency, strength and durability, non-leakable and non-freezable features as well as its ease of repair.

We invite correspondence from those interested in a Practical and Serviceable Truck Radiator.

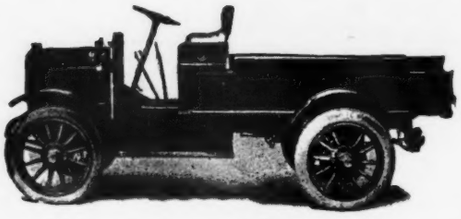
CANDLER RADIATOR COMPANY
DETROIT, MICH.

FAFNIR

SEND FOR CATALOG
FAFNIR BEARING COMPANY
NEW BRITAIN, CONN.

Flint

About 2000 Lbs. Capacity



Another Satisfied User

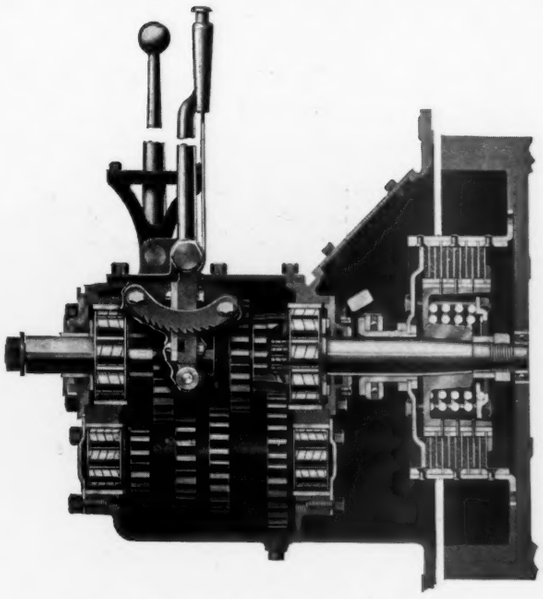
C. E. Brandt & Company, Wholesale Paper and Twine Dealers, Flint, Mich., writes: "Because of the service your 'Flint' Truck has been giving us, we feel you should know how well we are pleased. It is doing the work of two horse-drawn vehicles, sometimes three. In service six days a week without any trouble. Loads run from 1200 to 2000 pounds. Averages 12 miles to gallon gasoline, and 100 miles to gallon oil."

This is the sort of service that is built into all "Flint" Trucks. They satisfy both user and dealer.

FLINT MOTOR WAGON DEPARTMENT
DURANT-DORT CARRIAGE COMPANY, FLINT, MICH.

COVERT

TRANSMISSIONS



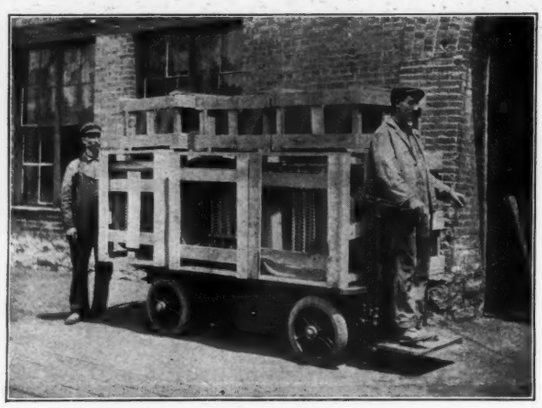
The New Covert Unit Power Plant Transmission

The name COVERT stands for quality. It means an efficiency in power transmission that is unsurpassed. It is the recognized standard in its field. Its superiority is shown by predominance in cars and trucks that are noted for their quality.

If you are striving to build cars that shall give the utmost in service you cannot do better than to incorporate COVERT TRANSMISSIONS in them. It will be profitable for you to consult our engineers regarding the adoption of COVERT TRANSMISSIONS for your cars or trucks.

COVERT MOTOR VEHICLE CO.

FACTORY: Lockport, N. Y. **SALES OFFICE: Detroit, Mich.**



This Industrial Truck, equipped with 20 cells of Type MV-11 "Ironclad-Exide" Battery, is used in the manufacturing plant of Pierce, Butler & Pierce Co. at Eastwood, near Syracuse, N. Y.

The "Ironclad-Exide" Battery For Industrial Trucks

The economy and efficiency of Industrial Trucks, operated by storage batteries, is rapidly bringing them to the attention of manufacturers.

As in other types of storage battery propelled vehicles, the cost of operation and the service procured are to a great degree dependent upon the battery with which trucks are equipped.

The "Ironclad-Exide" Battery, now in its fifth year of successful service, has been very widely used in both commercial and pleasure electric vehicles with most satisfactory results.

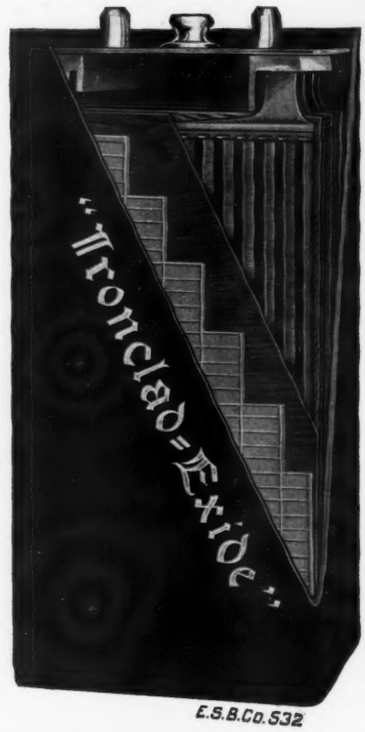
It is unquestionably the battery for Industrial Trucks. It is reliable—day in and day out—every day in the year. No delays—no fuss—no inconveniences—always dependable.

It is the battery for big loads and hard service. It hauls the most for the longest time with the least trouble and at the least expense.

It is economical to use and economical to maintain. It's good when new and it stays good. It's a business battery for business men.

It is used by the largest electric vehicle users in the country.

Our office near you will be glad to furnish further information.



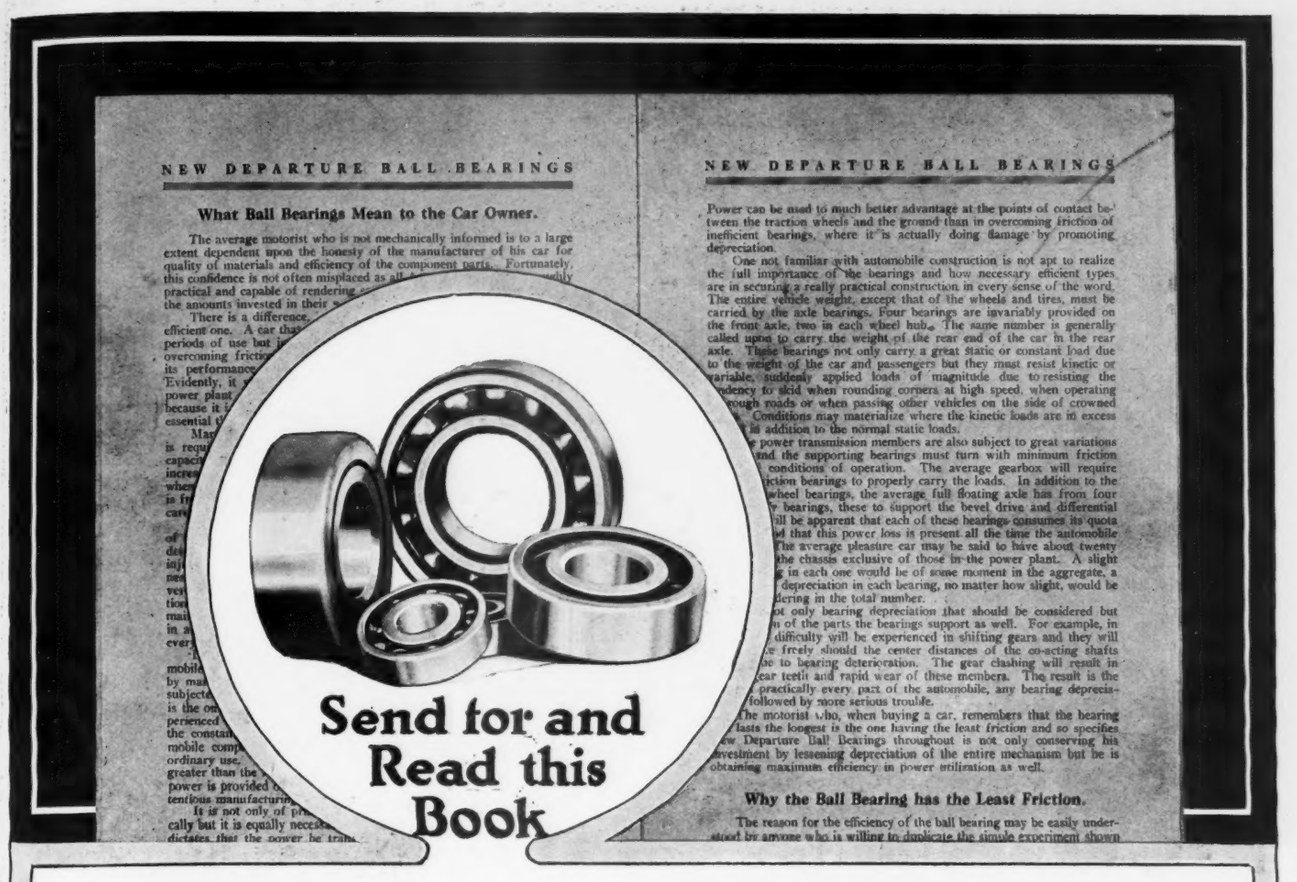
The illustration shows a Type 7-MV "Ironclad-Exide" cell with wood separator, negative plate and rubber jar cut away to show construction. The positive plate consists of metal top and bottom bars, connected by a series of conducting rods, each surrounded by active material, protected and held in place by horizontally laminated hard rubber tubes.

THE ELECTRIC STORAGE BATTERY CO.

1888 **PHILADELPHIA, PA.** 1915

OFFICES

Philadelphia	Boston	St. Louis	Atlanta	Detroit	Washington	Los Angeles	Seattle
New York	Pittsburgh	Chicago	Cleveland	Denver	Rochester	San Francisco	Toronto


NEW DEPARTURE BALL BEARINGS
What Ball Bearings Mean to the Car Owner.
The average motorist who is not mechanically informed is to a large extent dependent upon the honesty of the manufacturer of his car for quality of materials and efficiency of the component parts. Fortunately,
NEW DEPARTURE BALL BEARINGS
Power can be used to much better advantage at the points of contact between the traction wheels and the ground than in overcoming friction of inefficient bearings, where it is actually doing damage by promoting depreciation.
One not familiar with automobile construction is not apt to realize the full importance of the bearings and how necessary efficient types are in securing a really practical construction in every sense of the word. The entire vehicle weight, except that of the wheels and tires, must be carried by the axle bearings. Four bearings are invariably provided on the front axle, two in each wheel hub. The same number is generally called upon to carry the weight of the rear end of the car in the rear axle. These bearings not only carry a great static or constant load due to the weight of the car and passengers but they must resist kinetic or variable, suddenly applied loads of magnitude due to resisting the tendency to skid when rounding corners at high speed, when operating
Why the Ball Bearing has the Least Friction.
The reason for the efficiency of the ball bearing may be easily understood by anyone who is willing to duplicate the simple experiment shown
Send for and Read this Book

NEW DEPARTURE BALL BEARINGS

American Made for American Trade

EXEMPLIFY true rolling motion—They are *not* point contact bearings.

In practical ball bearings there is no such thing as point contact.

In New Departure Ball Bearings there is always a well defined area of the balls under load, in contact with the raceways upon which they roll.

In rolling, the balls constantly present new areas of contact to the load. It is impossible therefore, for wear to concentrate upon any given area, as is always the case with all bearings other than the ball type.

THE NEW DEPARTURE MANUFACTURING CO.

BRISTOL, CONN., U. S. A.

Distributors in Trade Centers Throughout the United States.

Western Branch: 1016-17 Ford Bldg., Detroit, Mich.

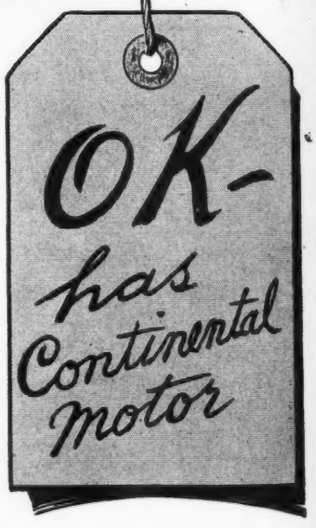
Sole British Agents: Brown Brothers, Limited London and Manchester.

A Continental Guarantees Haulage Service

THE pre-eminent quality that is built into every Continental Motor is everywhere acknowledged—and has been for twelve years past. Keen and progressive truck manufacturers have founded great successes on the ability of Continental Motors to stand hard use, to work on and on, season after season, with a minimum of repair and upkeep.

A truck is only as good as the motor in it. When the motor is the best—a Continental—the truck is a leader. It is stamped as an honest value, and a safe investment.

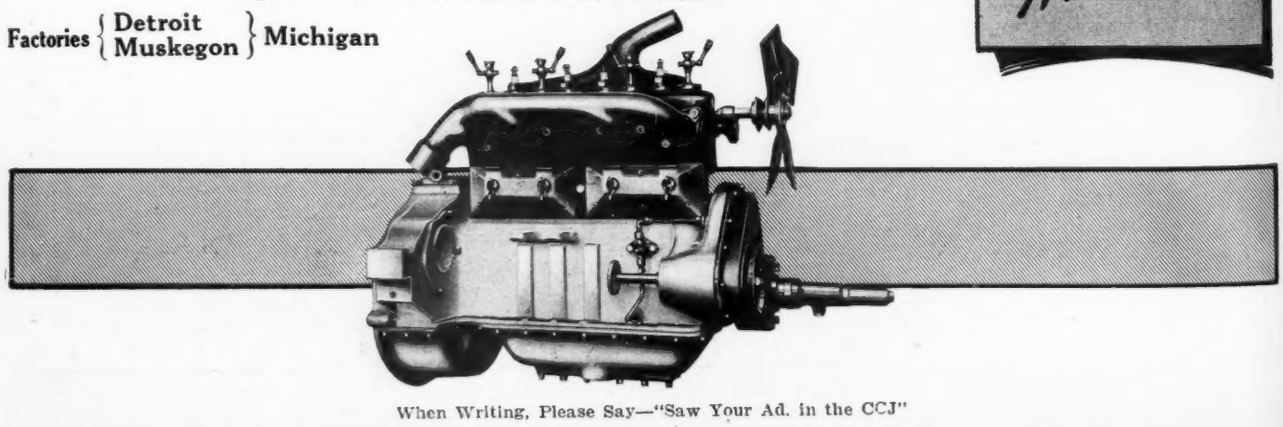
Guarantee your haulage service with the known quality of the Continental Motor.



CONTINENTAL MOTOR MFG. CO., Detroit, Michigan

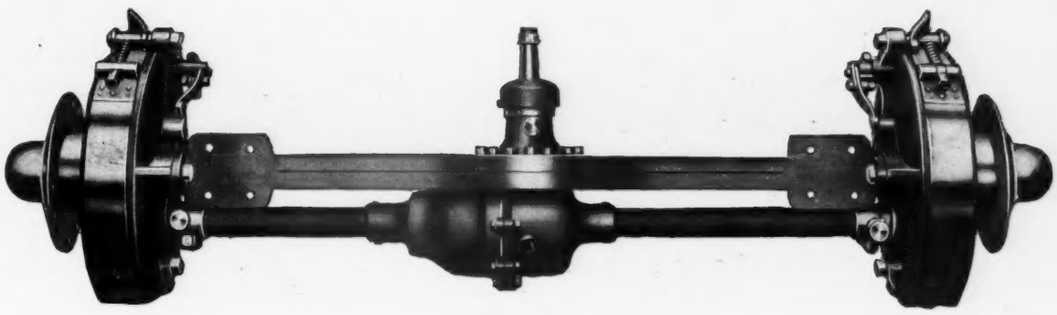
Largest Exclusive Motor Builders in the World

Factories { Detroit / Muskegon } Michigan



TORBENSEN INTERNAL GEAR DRIVE AXLES

Add to the Life of the Motor Truck



The value of a motor truck is in exact proportion to the **service** it is capable of giving. The man who buys it invests his money in **service.** Whether he makes a good or a bad investment depends on the endurance and efficiency of the truck.

Torbensen-equipped trucks have delivered service to users over periods of time far beyond the average life of motor trucks. Engineers who judge by results alone have specified Torbensen Axles as standard equipment on light and heavy trucks for every type of service.

By lifting the load from the driving axle and supplying a solid steel member to carry it, endurance is more than doubled. The life of a truck ceases when it can no longer transmit its power to the rear wheels. Torbensen design supplies an advanced **internal gear** transmission system and then safeguards it from wear and tear.

A Torbensen Axle will add to the service life of your truck by supplying invincible strength where the load centers and strain, stress and friction are greatest. If long life and economical operation mean anything to you, write for full details. Our Manufacturers' Proposition will interest you.

Torbensen Gear and Axle Company

E. 72nd St. and L. S. & M. S. R. R. **CLEVELAND, OHIO**

(Formerly Newark, N. J.)

FWD FWD

The "F. W. D." four wheel drive trucks are the FIRST and OLDEST trucks of the four wheel drive type in America.

We use NO GEARS in our WHEELS. Full floating front and full floating rear axles.

Our device is patented by us and used by us only.

The "F. W. D." is manufactured in a factory BUILT and EQUIPPED expressly to make TRUCKS.

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wis.

FWD FWD

When Writing, Please Say—"Saw Your Ad. in the CCJ"

Advertisers' Index

American Taximeter Co.... 73
Autocar Co..... 2

Baker R. & L Co..... 86
Bessemer Motor Truck Co.. 77
Bowen Mfg. Co..... 77
Bower Roller Bearing Co... 64
Bowling Green Motor Truck Co..... 82
Buchanan Electric Steel Co.. 63
Buckeye Jack Mfg. Co..... 87
Buda Co..... 72

Candler Radiator Co..... 88
Celfor Tool Co..... 55
Chase Motor Truck Co..... 46
Childs, O. J., Co..... 79
Cleveland Worm & Gear Co. 71
Continental Motor Mfg. Co.. 92
Couple-Gear Freight-Wheel Co..... 84
Covert Motor Vehicle Co... 89
Cramp, Wm. & Sons, S. & E. Bldg. Co..... 87
Cullman Wheel Co..... 74

Denby Motor Truck Co.... 85
Durant-Dort Carriage Co. Flint Motor Wagon Dept.. 88

Eames, John C., Inc..... 86
Edison Storage Battery Co.. 56
Eisemann Magneto Co..... 84
Electric Storage Battery Co.. 90

Fafnir Bearing Co..... 88
Federal Motor Truck Co... 58
Fedders Mfg. Co., Inc..... 44
Firestone Tire & Rubber Co. 41
Four-Wheel Drive Auto Co. 94
Fuller & Sons Mfg. Co..... 80

General Motors Truck Co... 49
General Vehicle Co., Inc.... 80
Gibney Tire & Rubber Co. 50, 51
Goodyear Tire & Rubber Co. 54
Gramm-Bernstein Co..... 76

Highland Body Mfg. Co.... 83
Hudford Co., Inside Front Cover
Hyatt Roller Bearing Co.... 62
Hydraulic Hoist Mfg. Co... 84

International Harvester Co. of America..... 72
International Motor Co.... 57

Janney, Steinmetz & Co.... 78
Jeffery, Thomas B., Co..... 86
Johns-Manville, H. W., Co... 45

Kelly-Springfield Tire Co... 68
Krebs Commercial Car Co.. 70

Laminated Shim Co., Inc... 80
Lavigne Gear Co..... 77
Lippard-Stewart Motor Car Co..... 88
Long Mfg. Co..... 71

McGraw Tire & Rubber Co.. 59
McQuay-Norris Mfg. Co.... 75
Mather Spring Co..... 68
Motometer Co..... 82

New Departure Mfg. Co... 91

Packard Motor Car Co..... 96
Parish & Bingham Co..... 87
Park Drop Forge Co..... 70
Philadelphia Storage Battery Co..... 84
Pierce-Arrow Motor Car Co.. 66, 67
Pierce Speed Controller Co.. 81
Polack Tyre & Rubber Co. Back Cover
Pyrene Mfg. Co..... 75

Republic Motor Truck Co. Front Cover
Rome-Turney Radiator Co. 82
Ross Gear & Tool Co..... 79
Rowe Motor Mfg. Co..... 83
Russel Motor Axle Co. Inside Back Cover
Rutenber Motor Co..... 76
Ryerson, Jos. T., & Son..... 83

Schwarz Wheel Co..... 80
Selden Truck Sales Co..... 65
Sheldon Axle & Spring Co. 52, 53
Signal Motor Truck Co.... 47
Silvex Co..... 95
Speedograph Sales Corp.... 83
Spicer Mfg. Co..... 85
Splitdorf Electrical Co..... 85
Spring Perch Co..... 69
Standard Motor Truck Co.. 87
Standard Steel Box Co..... 82
Stegeman Motor Car Co... 86
Stewart Motor Corporation.. 73

Templeton, Kenly & Co., Ltd. 48
Torbensen Gear & Axle Co.. 93
Troy Wagon Works Co.... 79
Tuthill Spring Co..... 81

United Motor Truck Co.... 78
United States Motor Truck Co..... 78

Van Dorn & Dutton Co.... 78
Variety Mfg. Co..... 60
Veeder Mfg. Co..... 74

Warner Gear Co..... 69
Waukesha Motor Co..... 79
Weston Electrical Instrument Co..... 85
West Steel Casting Co..... 61
White Co..... 43
Wisconsin Motor Mfg. Co... 77
Wood Hydraulic Hoist & Body Co..... 76

BETHLEHEM FIVE POINT SPARK PLUGS

FOR

COMMERCIAL VEHICLES

Bethlehems are built to stand the strain—the rack—the vibration.

Bethlehem performance warrants the guarantee under which they are sold—

"Guaranteed for the Life of the Car"

Made in special types for motors in which ordinary plugs cannot deliver.

Write for information, prices, etc.

The Silvex Co.

New York N. Y. | So. Bethlehem Pa. | Oakland Cal.

It costs no more to buy Packard New Model Chainless Trucks and it costs less to operate and maintain them

There is a Packard New Model Truck for every kind of hauling—seven sizes, every size in various wheel bases and platform lengths. They comprise the only complete series of silent, up-to-date chainless trucks.

But their efficiency and economy do not depend upon the chainless drive or any other single detail of construction.

They are new generation trucks in every feature and every feature is a plain, practical reason why Packard New Model Trucks improve service and save money.

A study of the catalog—or, an examination of the trucks themselves, is a duty every executive owes to his business.

1-ton chassis - -	$2200	4-ton chassis - -	$3800
1½-ton chassis -	2500	5-ton chassis - -	4300
2-ton chassis - -	2800	6-ton chassis - -	4800
3-ton chassis - -	3400	*F. O. B. Detroit*	

Early delivery on 3 and 4 ton sizes.

PACKARD MOTOR CAR COMPANY, *Detroit*

DETROIT USA

Packard

Russel

—*the name that ensures quality in motor truck axles.*

FOR four years we have specialized in the manufacture of jack shafts for motor trucks. As a result of our success with this product, a majority of the companies making trucks of 1 to 2-ton capacities have used and are now using the Russel jack shaft.

During the past two years the truck industry has rapidly developed and there has been a growing demand for a more satisfactory truck than is possible with chains and sprockets.

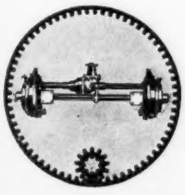
Anticipating this demand, we commenced an investigation of the various types of final drives for motor trucks in use in Europe where the gasoline truck experience is older and, owing to military demands, riper than at home.

Our investigations developed the fact that military trials—the most rigid possible tests—had proven the internal gear drive to be superior to other chainless forms on the score of reliability, ease of maintenance, and durability.

Our own subsequent experience has confirmed these results and in addition has proven its quietness and efficiency.

So we decided to make an internal gear drive axle that in design incorporates the best features of the Daimler-Mercedes and Krupp in Germany, De Dion and Schneider in France and the Austro-Daimler and Skoda in Austria.

The high-class workmanship and quality of materials that have established the reputation of our jack shafts is ample assurance that our internal gear drive axles will give the same high efficiency and durability as are required by the European Governments.



Russel Motor Axle Company
North Detroit, Michigan

Part of the Fleet of the CHR. HEURICH BREWING CO., Washington, D. C.
The entire fleet of eight trucks is equipped exclusively with POLACK TYRES.

HERE IS THE TYRE-RECORD:

4½ ton Commer Truck, No. 1

Wheel	Period in Service	Mileage	
L. F.	2 years	21,000	
R. F.	2 years, 1 mo.	22,000	(still running)
L. R.	2 years, 1 mo.	no record	(still running)
R. R.	1 year, 1 mo.	10,000	

3½ ton Commer Truck, No. 3

L. F.	2 years, 3 mos.	17,000	(still running)
R. F.	2 years, 3 mos.	17,000	(still running)
L. R.	1 year, 5 mos.	no record	(still running)
R. R.	1 year, 5 mos.	no record	(still running)

3½ ton Commer Truck, No. 4

L. F.	2 years, 4 mos.	19,000	(still running
R. F.	2 years, 4 mos.	19,000	(still running)
L. R.	2 years, 3 mos.	19,000	
R. R.	1 year, 6 mos.	12,150	

3½ ton General Vehicle (Electric), No. 8

Complete Set	2 years, 2 mos.	13,000	(all tyres still running in good condition)

"We might add that we feel entirely satisfied with your tyres, after using them for over two years, as evidence of which we recently specified only Polack tyres on four trucks purchased by us, Polack tyres now being used by us exclusively on our entire fleet of eight trucks.

CHR. HEURICH BREWING CO."

This is a typical POLACK record—just ordinary POLACK Service

We have innumerable other records like this, at your service. Send a postcard.

POLACK TYRE & RUBBER CO.

1876 Broadway, New York Factory, Bridgeport, Conn.

ALBANY
BALTIMORE
BUFFALO
BOSTON
BRIDGEPORT
CHARLESTON
CHICAGO
CINCINNATI
CLEVELAND
DAYTON
DETROIT
GRAND RAPIDS
KANSAS CITY
LOS ANGELES
MONTREAL
NEWARK
PATERSON
PHILADELPHIA
PITTSBURGH
PROVIDENCE
RICHMOND
ST. LOUIS
TORONTO
WASHINGTON